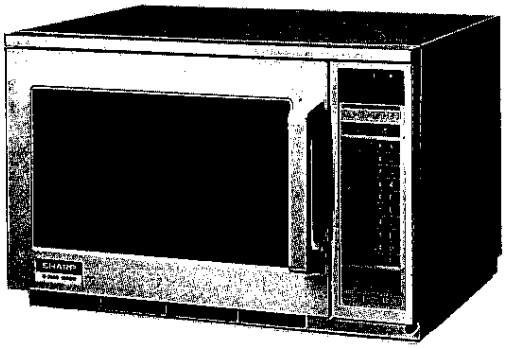
SHARP® SERVICE MANUAL

S3003R2390H//



COMMERCIAL MICROWAVE OVEN

MODEL R-2390

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

SERVICE MANUAL

SHARP

COMMERCIAL

MICROWAVE OVEN

R-2390

GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

CAUTION
MICROWAVE RADIATION

Service engineers should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured. Never operate the device without a microwave energy absorbing load attached.Never look into an open waveguide or antenna while the device is is energized.

WARNING

Never operate the oven until the following points are ensured.
(A) The door is tightly closed.
(B) The door brackets and hinges are not defective.
(C) The door packing is not damaged.
(D) The door is not deformed or warped.
(E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

All the parts marked "**" on parts list are used at voltages more than 250V.

SHARP CORPORATION

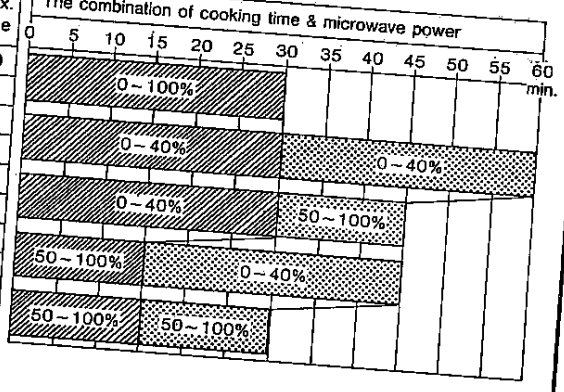
OSAKA, JAPAN

PRODUCT DESCRIPTION

SPECIFICATION

ITEM	DESCRIPTION
Power Requirements	220 – 230 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	Microwave cooking 2.6 kW Approx. 11.5 A
Power Output	1600 watts nominal of RF microwave energy (method of IEC 705) Operating frequency of 2450MHz
Outside Dimensions	Width 510 mm Height 335 mm including foot Depth 415 mm
Cooking Cavity Dimensions	Width 330 mm Height 210 mm Depth 310 mm
Turntable diameter	330mm
Control Complement	Touch Control System Timer The combination of cooking time & microwave power Your oven can be programmed a series of up to 2 cooking stages. The combination of microwave power and cooking time that can be input is as follows.

Cooking Sequence		max. time
1 stage cooking	first stage	30
2 stage cooking	first stage	30
	second stage	30
2 stage cooking	first stage	30
	second stage	15
2 stage cooking	first stage	15
	second stage	30
2 stage cooking	first stage	15
	second stage	15



Microwave power level
100 % 90 % 80 % 70 % 60 % 50%
40 % 30 % 20 % 10 % 0%
Manual time set key
Microwave power setting key
Stop/Clear key
Start key
Double quantity key
Express defrost key
Set key
Check key
Volume key

Set Weight	Approx. 32.0 kg

GENERAL INFORMATION

WARNING

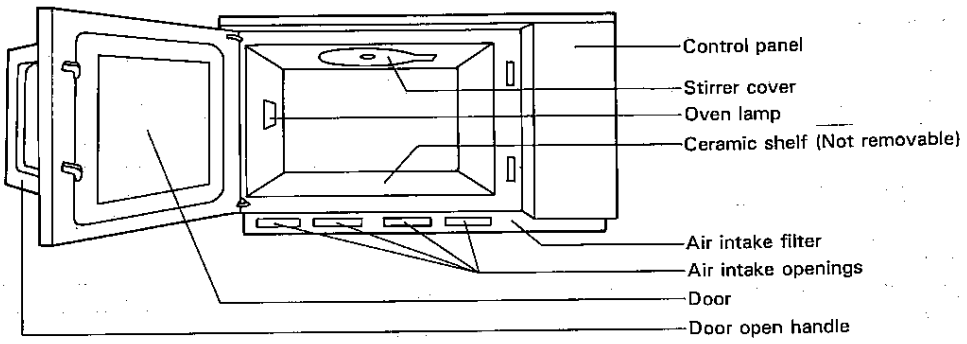
THIS APPLIANCE MUST BE EARTHED

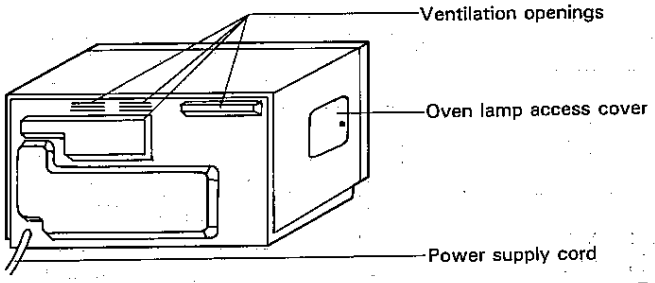
IMPORTANT

THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

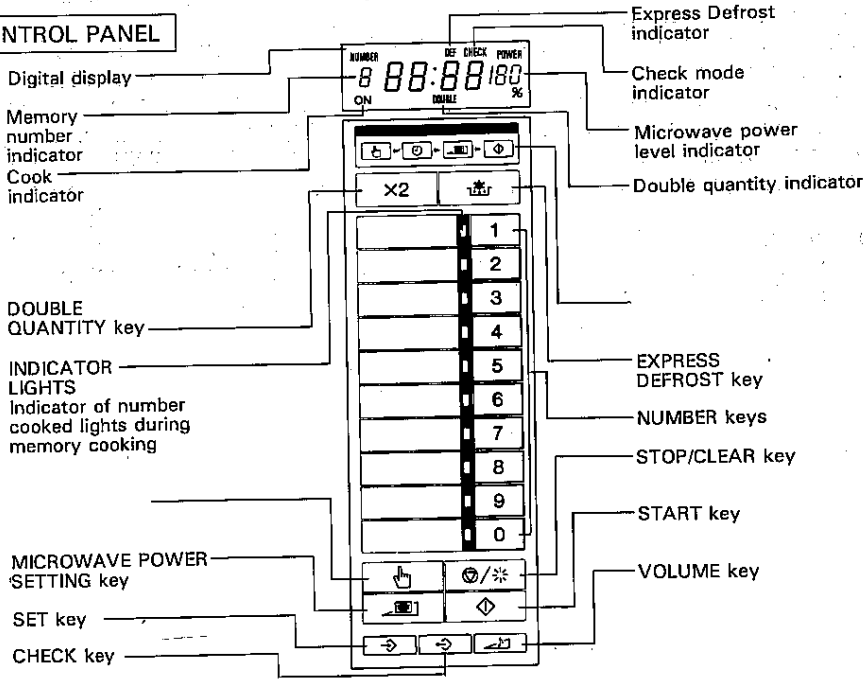
GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

APPEARANCE VIEW





CONTROL PANEL



OPERATING SEQUENCE

OFF CONDITION

Closing the door activates all door interlock switches (1st latch switch, 2nd latch switch, 3rd latch switch and stop switch)

IMPORTANT
When the oven door is closed, the monitor switch contacts COM-NC must be open.
When the microwave oven is pluged in a wall outlet (220 to 230 volts, 50Hz), the line voltage is supplied to the point A5 + A7 in the control panel.

Figure O-1 on page 48

1. The display flashes [ ].
2. To set any programmes except manual cooking, cancel PROGRAMME LOCK by touching STOP/CLEAR key twice and then touching NUMBER key [0].

NOTE: When the door is opened or after cooking, oven lamp and blower motor wark for 1 minutes.

MICROWAVE COOKING CONDITION

Touch MANUAL TIME SET key and enter a desired cooking time with the touching NUMBER key. And then touch START key.

Function sequence Figure O-2 on page 48

CONNECTED COMPONENTS	RELAY
Oven lamp / Blower motor	RY1
Power transformer T1	RY3
Power transformer T2	RY4

1. The line voltage is supplied to the primary winding of the power transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltagedoubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wave length of 12.24 cm. This energy is channeled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays RY3 + RY4 go back to their home position. The circuits to the power transformers T1 + T2.
   The relay RY1 remains and oven lamp and blower motor wark for 1 minute.
5. When the door is opened during a cook cycle, the switches come to the following condition.

SWITCH	CONTACT	CONDITION DURING COOKING	CONDITION DOOR OPEN (NO COOKING)
1st latch switch	COM-NO	Closed	Open
Monitor switch	COM-NC	Open	Closed
2nd latch switch	COM-NO	Closed	Open
Stop switch	COM-NO	Closed	Open
3rd latch switch	NO-NO	Closed	Open

The circuits to the power transformers T1 + T2 are cut off when the 1st latch, 2nd latch, 3rd latch and stop switches SW1 + SW2 + SW3 + SW5 are made open. The blower motor BM and remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay RY1 stays closed. Shown in the display is the remaining time, but the program is canceled if the oven is not started within 3 minutes.

6. MONITOR SWITCH CIRCUIT
   The monitor switch SW4 is mechanically controlled by oven door, and monitors the operation of the 1st latch switch SW1.

6-1 When the oven door is opened during or after the cycle of a cooking program, the 1st, 2nd, 3rd latch and stop switches SW1 + SW2 + SW3 + SW5 must open their contacts first. After that the contacts (COM-NC) of the monitor switch SW4 can be closed.

6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch SW4 must be opened first. After that the contacts (COM-NO) of the 1st, 2nd, 3rd latch and stop switches SW1 + SW2 + SW3 + SW5 must be closed.

6-3. When the oven door is opened and the contacts of the 1st latch switch SW1 remain closed, remains closed, the fuse F4 F6.3A will blow, because the monitor switch is closed and a short circuit is caused.

TWO MAGNETRON OPERATION SYSTEM

Two magnetrons MG1 + MG2 are equipped in order to get higher microwave power output.
The primary windings of the power transformers T1 + T2 are connected so that each magnetron can be osillated alternatively according to the frequency of the power supply. Refer to the Figure 1 and 2.

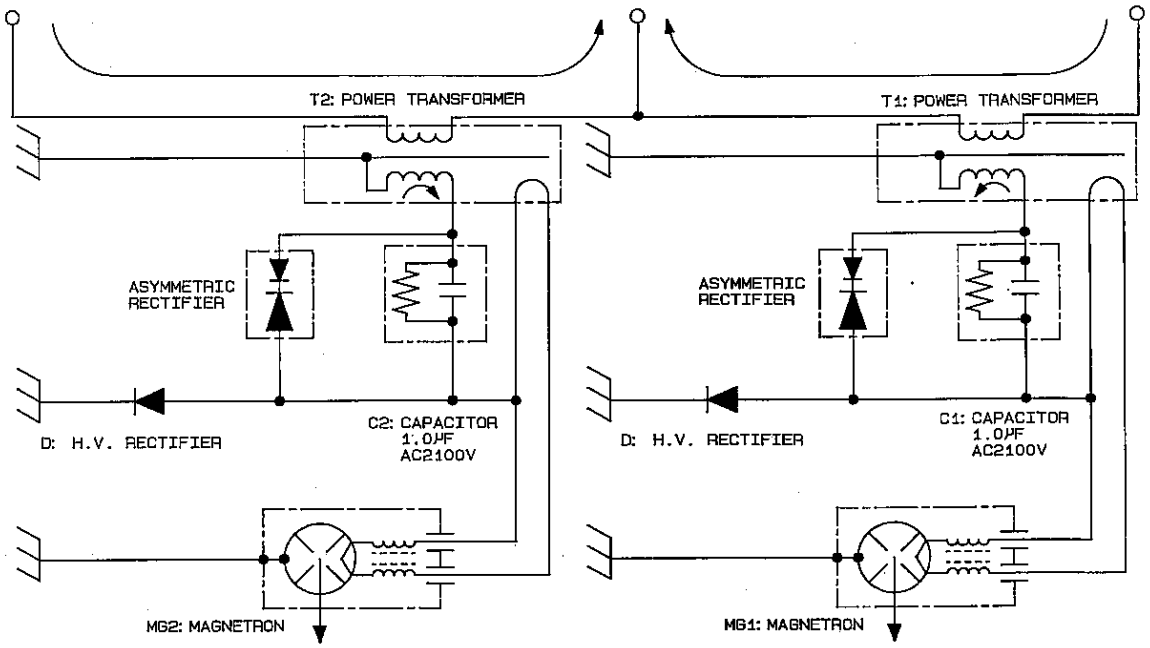


Figure S-1. High Voltage Circuit

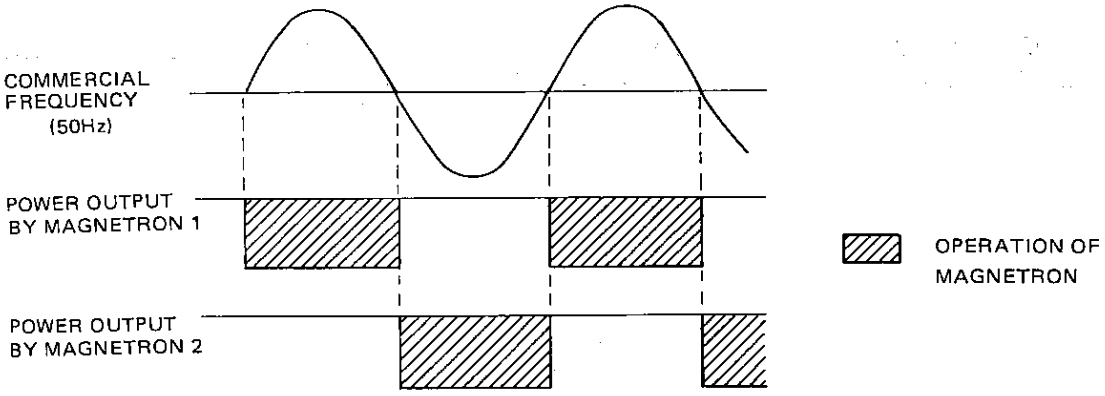
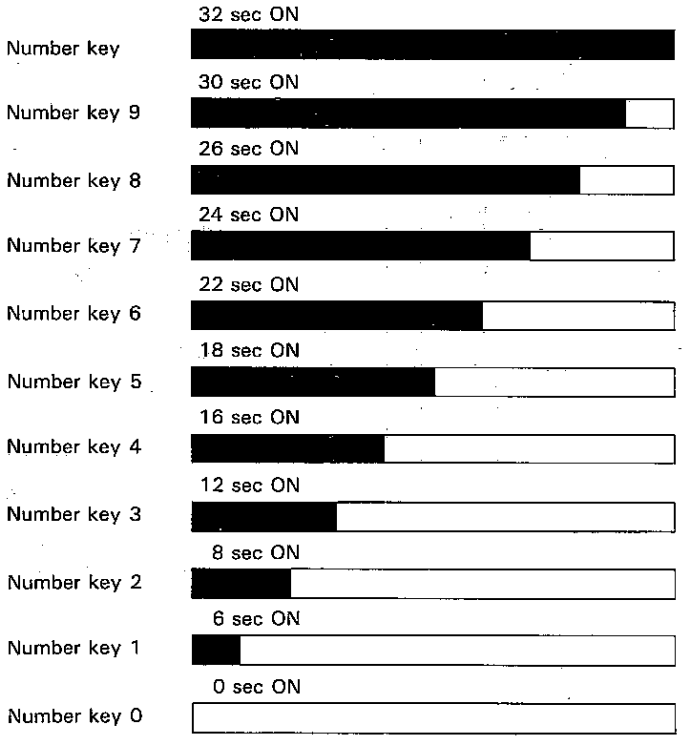


Figure S-2. Operation of Magnetron

MICROWAVE VARIABLE COOKING

When the microwave oven is preset for variable cooking power, the line voltage is supplied to the power transformers T1 + T2 intermittently within a 32 second time base through the contacts of the relays RY3 + RY4.
The following levels of microwaves power are given.



NOTE: The ON/OFF time ratio does not exactly correspond to the percentage of microwave power, because approx. 2 seconds are needed for heating up the magnetron filament.

FUNCTION OF IMPORTANT COMPONENTS

1ST LATCH, 2ND LATCH, 3RD LATCH SWITCHES AND STOP SWITCH SW1 + SW2 + SW3 + SW5

1. When the oven door is closed, the contacts COM-NO must be closed.
2. When the oven door is opened, the contacts COM-NO must be opened.

MONITOR SWITCH SW4

The monitor switch is activated (the contacts opened) by the upper latch head and switch lever A while the door is closed. The switch is intended to render the oven inoperative by means of blowing the fuse F4 F6.3A when the contacts of the 1st latch switch SW1 fail to open when the door is opened.

Function

1. When the door is opened, the monitor switch SW4 contacts close (to the ON condition) due to their being normally closed. At this time the 1st latch switch SW1 is in the OFF condition (contacts open) due to their being normally open contact switches.
2. As the door goes to a closed position, the monitor switch contacts are opened and 1st latch switch contacts are closed (On opening the door, each of these switches operate inversely.)
3. If the door is opened and the 1st latch switch contacts fail to open, the fuse F4 F6.3A blows simultaneously with closing of the monitor switch contacts.

CAUTION: BEFORE REPLACING A BLOWN FUSE F4 F6.3A TEST THE 1ST LATCH SWITCH, MONITOR SWITCH AND MONITOR RESISTOR FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE").

MONITOR RESISTOR

The monitor resistor prevents the fuse F4 F6.3A 250V bursting when the fuse F4 F6.3A 250V blows due to the operation of the monitor switch.

NOISE FILTER

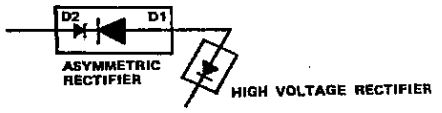
The noise filter assembly prevents radio frequency interference that might flow back in the power circuit.

13A SPECIAL FUSE F3

If the wire harness or electrical components are shortcircuited, this special fuse F3 blows to prevent an electric shock or fire hazzard.

ASYMMETRIC RECTIFIER

The asymmetric rectifier is solid state device that prevents current flow is both directions. And it prevents the temperature rise of the power transformer by blowing the fuse M8A F1 or F2 when the high voltage rectifier is shorted.



The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.5 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of the blowing the fuse M8A F1 or F2)

1. The high voltage rectifier is shorted by any causes when microwave cooking.
2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.5 KV in the voltage doubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltage winding of the power transformer.
5. The large electric currents beyond 8A flow through the primary widing of the power transformer.
6. The fuse F1 or F2 blows by the large electric currents.
7. The power supplying to the power transformer is cut off.

FUSE F6.3A 250V F4

1. If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazzard.
2. The fuse also blows when 1st latch switch SW1 remains closed with the oven door open and when the monitor switch SW4 closes.

THERMISTOR

The thermistor is a negative temperature coefficient type. The temperature in the exhaust duct is detected through the resistance of the thermistor.
If the temperature rises about 120 °C, the control panel will display [EE 7] and the oven will stop to avoid overheating and catching fire.

SURGE RELAYS RY-S1 AND RY-S2 AND SURGE RESISTORS R1 AND R2

When the START key is touched the contacts of the surge relays RY-S1 + RY-S2 close and the surge current flows through the surge resistors R1 + R2 for 200 msec. After about 8 sec. since the START key is touched the surge relays RY-S1 + RY-S2 closes and supply the power transformer with the line voltage. After 200 msec. the surge relays RY-S1 + RY-S2 open their contacts and gets out of function. The surge resistors R1 +R2 lets the current (peak current) flow when the oven is switched on. If surge resistors are defective, the home fuse, the fuses F1 + F2 + F3 may break down when the oven is switched on.

CAUTION; THE SURGE RELAYS RY-S1 + RY-S2 CLOSE FOR ONLY 200 MSEC. JUST WHEN THE OVEN GETS RESTARTED, BUT OPENS AGAIN. WITHIN THIS 200 MSEC., THE RELAYS RY-S1 + RY-2 MUST CLOSE.

BLOWER MOTOR BM

The blower motor drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetrons and cools the magnetrons. This air is channeled through the oven cavity to remove steam and vapors given off from the heating foods. It is then exhausted through the exhausing air vents at the oven cavity.

MG THERMAL CUT-OUTS 145 °C TC1, TC2

These thermal cut-outs protect the magnetrons against overheat. If their temperature go up higher than 145 °C because the blower motor is interrupted, the ventilation openings are blocked, the thermal cut-outs TC1 + TC2 will open and the line voltages to the power transformer T1 + T2 will be cut off and the operations of the magnetrons MG1 + MG2 will be stoped.
The thermal cut-outs TC1 + TC2 will close their contacts again when their temperatures go down lower than −20 °C.

BLOWER MOTOR THERMAL CUT-OUT 115 °C TC3

This thermal cut-out protect the blower motor against overheat. If its temperature goes up higher than 115 °C because the blower motor is locked or the ventilation openings are blocked, the contacts of the thermal cut-out TC3 will open and the line voltage to the control unit will be cut off and the operation of the oven will be stoped.
The thermal cut-out TC3 will be close its contacts again when its temperature goes down lower than −20 °C.

OVEN TEMP. FUSE 150 °C TF

This temp. fuse protects the oven against overheat. If the temperature goes up higher than 150 °C because the food catches fire, the contacts of temp. fuse TF will open and the line voltage to the control unit will be cut off and the operation of the oven will be stoped. The defective temp. fuse must be replaced with a new rated one.

DOOR OPEN MECHANISM

1. The door release lever is pulled.
2. The upper latch head is lifted up by the linked door release lever.
3. The latch lever is lifted up by the door release lever.
4. The joint lever is lifted up by the latch lever.
5. The lower latch head is lifted up by the joint lever.
6. Now both latch heads are lifted up, so they can be released from the latch hook.
7. Now the door can be opened.

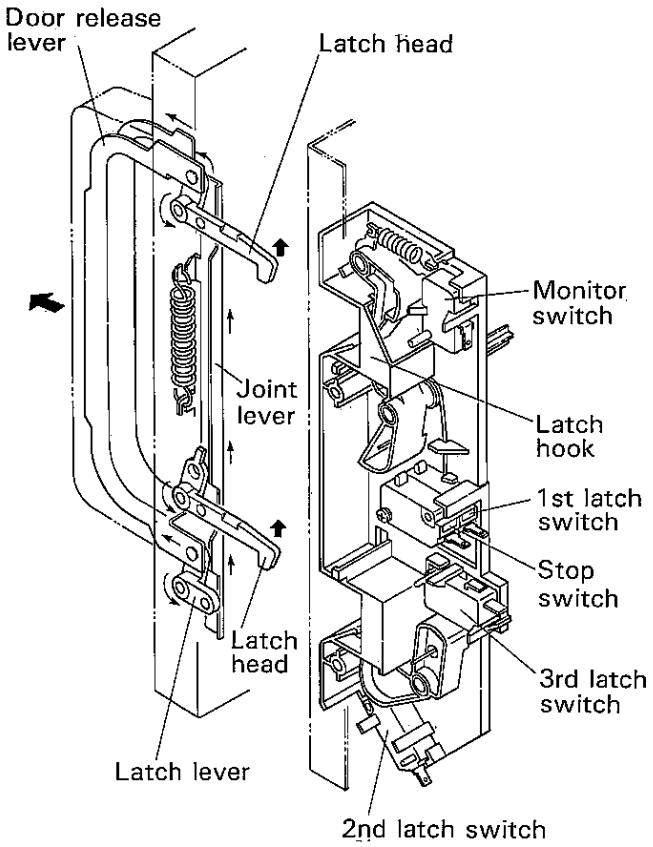


Figure D-1.Door Open Mechanism

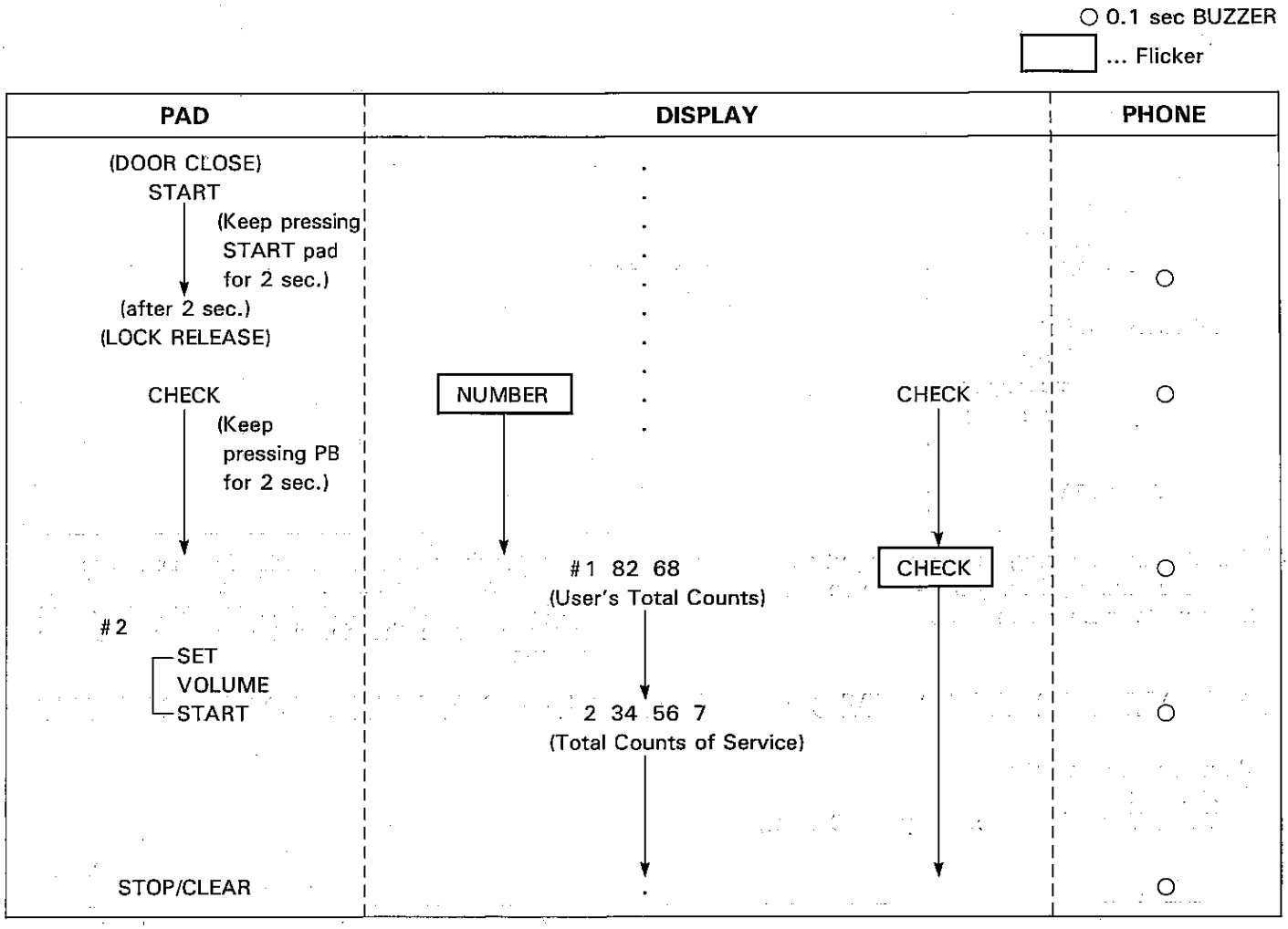
METHOD FOR CHECKING SERVICE COUNTS OF MICRO-WAVE OVEN (POST-SALES SERVICE-PURPOSE)

1. Object:
This instruction manual is purposed to instruct handling practice of count data to post-sales servicemen only who will be capable of assuring grand total service counts after selling the oven set.

2. Specification:
This counter outputs grand total counts of service at memory cooking, double volume cooking, manual cooking, and express defrost. The maximum capacity of this counter is 999,999 counts, above which the counter resets to 0. Even without back-up by power supply, clear-out will not be activated.

3. Operating Practice

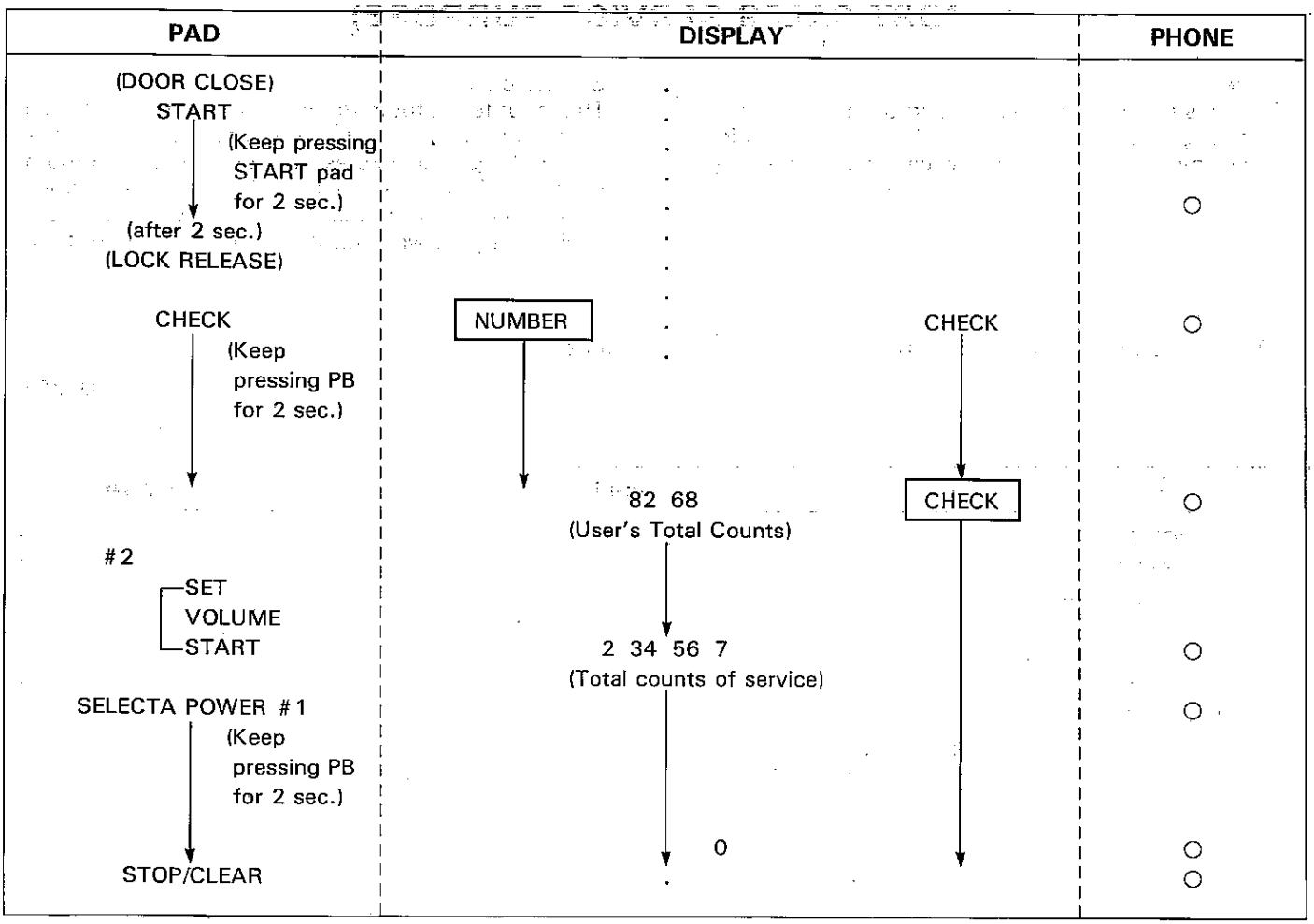
1) Practice for checking total service counts. (234,567 Counts)



1 Denotes total service counts within the reach of user, of which checking and clearing practices are described in this instruction manual.

2 Denotes the operating practice for user to enable neither checking, nor clearing. This practice, however, shall be instructed to post-sales serviceman only, and excluded from the description in the manual.

2) Practice for clearing service total counts. (234,567 counts)



1 Denotes that keeping to press output selector key for 2 sec. during display of service counts, enables the counts to be cleared to 0.

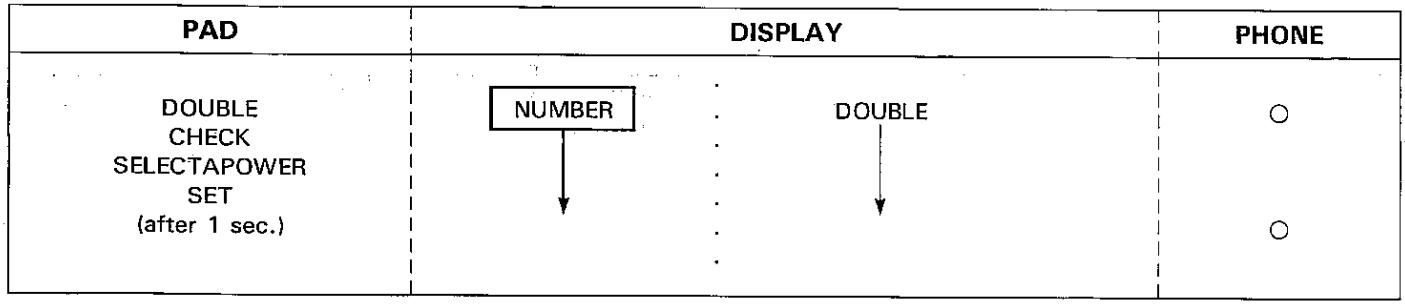
2 Denotes the operating practice for user not to enable clearing. This practice, however, shall be instructed to post-sales service man only, and excluded from the description in the instruction manual.

INITIALIZING THE MEMORY AFTER REPAIRING THE CONTROL UNIT

1. Clearing the counters

(1)User counter
(Total, Manual, Memory, Express Defrost)

□ ...flash ○ 0.1 sec



(2)Total service counter
Clear this counter referring to Service Counter Checking item 2) Practice for clearing service total counts.(234,567 counts)

2. Checking the cooking constants

Check the cooking constants listed on page 29 in the Service Manualin the following manner. If different from specified, preset them the following way.

(1)Memory

1) To set memory for 1 servings.

[ ] ...flash ○ 0.1 sec

PAD	DISPLAY	PHONE
(Door close)		
START		
↓ (2sec)		○
(LOCK RELEASE)		
SET	[NUMBER]	○
1	NUMBER1	○
SELECTATIME	0	○
5	5	○
SET		○
SET	[NUMBER]	○
2	NUMBER2	○
SELECTATIME	0	○
1,0	1 0	○ X2
SET		○

(2)To check the memory

PAD	DISPLAY	PHONE
(Door close)		
START		
↓ (2sec)		○
CHECK	[NUMBER] CHECK	○
1	NUMBER1 5 POWER 100% ↓	○
2	NUMBER2 1 0 POWER 100%	○

DOUBLE

1) To set magnifucation for 2 servings in the memory 1.

[ ] ...flash ○ 0.1 sec

PAD	DISPLAY	PHONE
(Door close) START ↓ (Keep pressing PB for 2 sec.)		○
SET #1 DOUBLE ↓ (Keep pressing PB for 2 sec.)	NUMBER ↓	○
1 SELECTATIME 1,8,0 SET	NUMBER1 ↓ 0.00 1.80	DOUBLE ↓ ○ ○ ○ ○ X3 ○

1 No key entry signal.

Standerd magnification for double quantity (1.80) is preset in all memories when the oven in forwarded.

2) To check the magnification for double quantity in the memory 1.

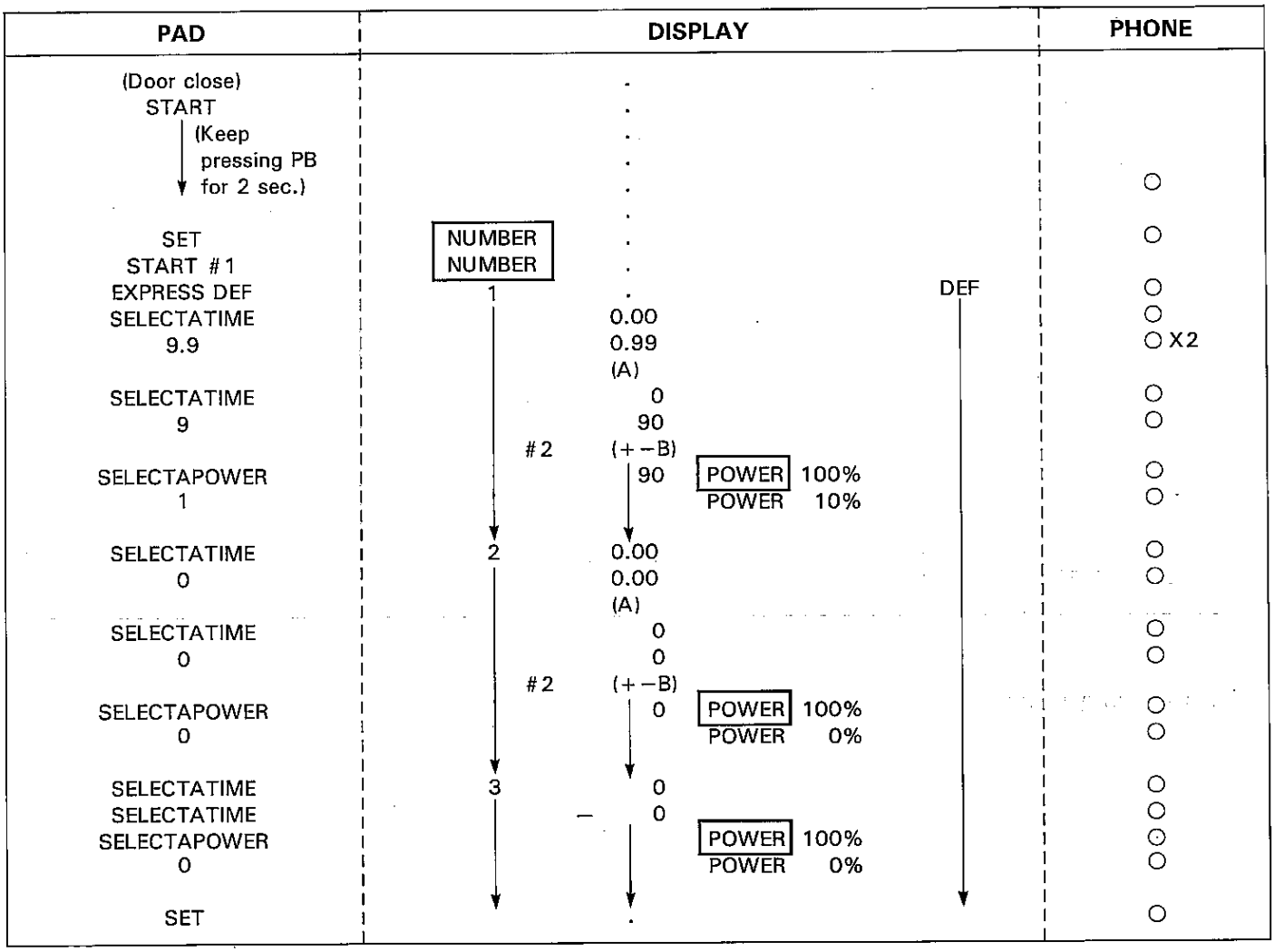
PAD	DISPLAY	PHONE
(Door close) START ↓ (Keep pressing PB for 2 sec.)		○
CHECK DOUBLE 1	NUMBER ↓ NUMBER1 1.80	CHECK ↓ DOUBLE ↓ ○ ○ ○

The other memory can be checked when you go oto touch the other memorykey.
" 0 " is displayed in the case that the memory is not set.

The STOP/CLEAR key has to be touched for the other operation.

EXPRESS DEFROST

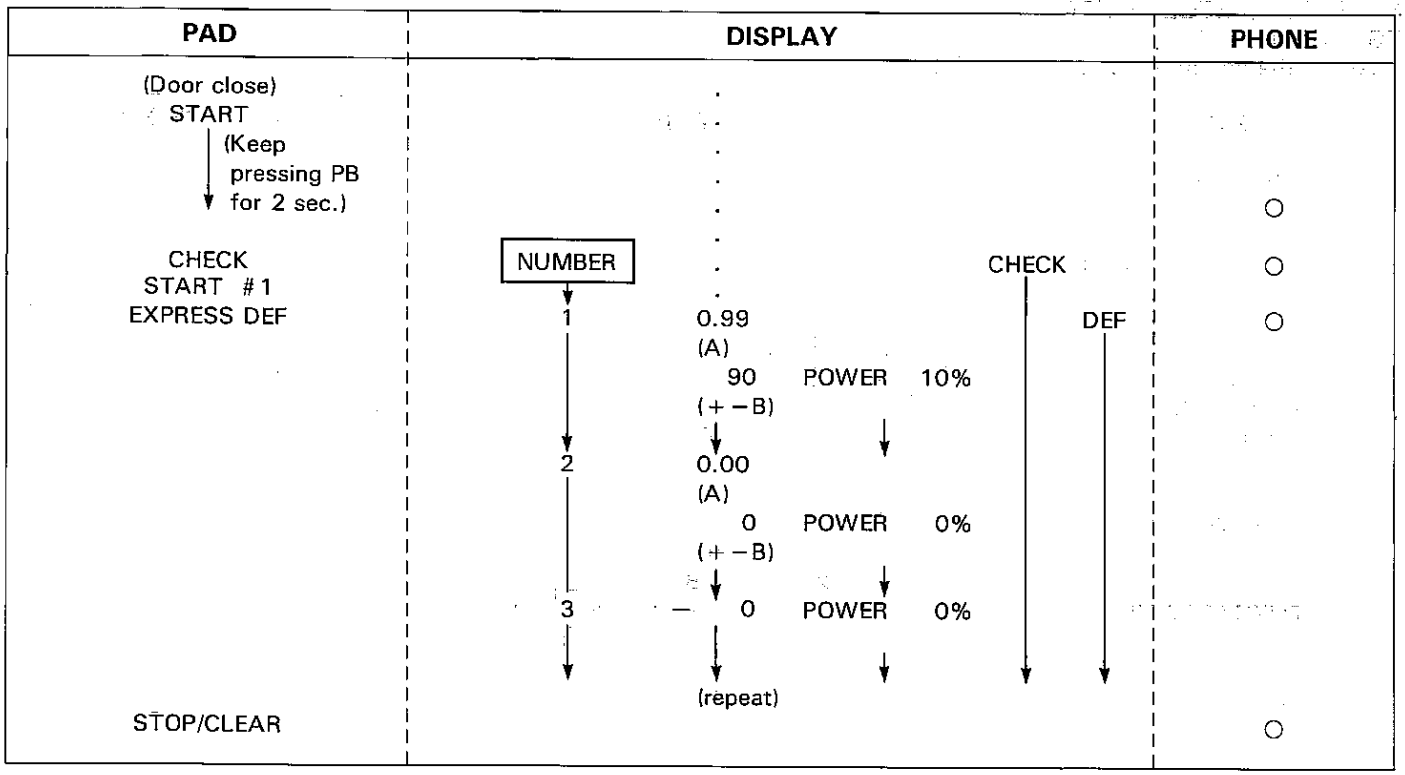
T1 = STG1 + STG2 + STG3
STG = A * T + B
1) To Set the constants of Express defrost.



1 No key entry signal.

2 To set − B, the selectapower key two times.

2) To check the constants of Express defrost.



#1 No key entry signal.

SERVICING

WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution.

REMEMBER TO CHECK 3D

1) Disconnect the supply.
2) Door opened, and wedged open.
3) Discharge high voltage capacitor.

WARNING AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may in, some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the power transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the power transformer.

REMEMBER TO CHECK 4R

1) Reconnect all leads removed from components during testing.
2) Replace the outer case (cabinet).
3) Reconnect the supply.
4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven tray, close the door and press Manual Time Set pad set the microwave timer for one (1) minute. Set the power level to 100% and push the START button. When the one minute has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks and re-examine the connections to the component being tested.

When all service work is completed, and the oven is fully assembled, the microwave power output should be checked and a microwave leakage test carried out.

TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven, it is helpfull to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure"section.

IMPORTANT: If the oven becomes inoperative because of a blown fuse F4 F6.3A in the 1st latch switch - monitor switch - monitor resisitor circuit, check the 1st latch switch, monitor switch and monitor resistor before replacing the fuse F4 F6.3A.

NOTE: "○" means direct cause and part. "△" means indirect cause and part.

CONDITION	PROBLEM \ TEST PROCEDURE / POSSIBLE CAUSE AND DEFECTIVE PARTS	A	A	B	B	C					D	D	E	E	E	E	E	F	F
						H.V. RECTIFIER ASSEMBLY WITH HVC HARNESS ASSEMBLY													
		MAGNETRON MG1	MAGNETRON MG2	POWER TRANSFORMER T1	POWER TRANSFORMER T2	H.V. RECTIFIER FOR MG1	H.V. RECTIFIER FOR MG2	ASYMMETRIC RECTIFIER FOR MG1	ASYMMETRIC RECTIFIER FOR MG2	H.V. HARNESS	H.V. CAPACITOR C1	H.V. CAPACITOR C2	1ST LATCH SWITCH SW1	2ND LATCH SWITCH SW2	3RD LATCH SWITCH SW3	MONITOR SWITCH SW4	STOP SWITCH SW5	FUSE M8A F1	FUSE M8A F2
OFF CONDITION	[ ] does not appear in display but power supply cord is plugged into wall outlet.																		
	Keys are touched but the programme can not be entered.																○		
	When the door is opened, FUSE F4 F6.3A blows.												○						
	Home fuse blows when power supply cord is plugged into wall outlet.																		
	13A SPECIAL FUSE F3 blows when power supply cord is plugged into wall outlet.																		
	Oven lamp and fan motor do not work for 1 minute whenever the door is opened or after cooking.																		
	[EE 7] appears in display.																		
	[EE 6] appears in display.																		
	FUSE F4 F6.3A blows when the power supply cord is plugged into wall outlet.															○			
	When the door is opened, blower motor works but oven lamp does not work.																		
	When the door is opened, oven lamp works but blower motor does not work.																		
ON CONDITION	[EE 1] appears in display.	○		○		○		○		○	○							○	
	[EE 2] appears in display.		○		○		○		○	○		○							○

													13A SPECIAL FUSE F3	G
												○	FUSE F6.3A F4	H
	○												MG THERMO-CUT 145°C TC1	I
○													MG THERMO-CUT 145°C TC2	I
												○	BLOWER MOTOR THERMAL TC3 CUT-OUT 115°C	I
												○	OVEN TEMP. FUSE 150°C TF	I
													SURGE RESISTOR R1	J
													SURGE RESISTOR R2	J
													MONITOR RESISTOR R3	J
													SURGE RELAY RY-1	K
													SURGE RELAY RY-2	K
					○	○							THERMISTOR	L
			○										OVEN LAMP	
			○										OVEN LAMP SOCKET	
▷	▷	○											BLOWER MOTOR	M
								○	○			○	NOISE FILTER	N
									○			○	POWER SUPPLY CORD	
												○	FUSE HOLDER	
												○	CORD CONNECTOR	
○	○					○		○	○				SHORTED WIRE HARNESS	
○	○	○	○		○		○					○	OPENED WIRE HARNESS	
○	○				○	○	○				○	○	TOUCH CONTROL PANEL	P
○	○						○						RELAY (RY1, 3, 4)	R
												○	FOIL PATTERN	S
▷	▷												BLOCKED VENTILATION OPENINGS	
▷	▷	○											BLOCKED BLOWER MOTOR	
											▷		MIS ADJUSTMENTS OF SWITCHES	
												○	HOME FUSE OR BREAKER	
												○	NO POWER AT WALL OUTLET	
													OVER THE MAX. COOKING TIME	
											○		DUE TO PROGRAMME LOCK	
						○							TEMPERATURE OF THERMISTOR IS HIGHER THAN 120°C	
						○							TEMPERATURE OF THERMISTOR IS HIGHER THAN 95°C IN 10 MINUTES AFTER STARTING THE OVEN.	

CONDITION	TEST PROCEDURE / POSSIBLE CAUSE AND DEFECTIVE PARTS / PROBLEM	A MAGNETRON MG1	A MAGNETRON MG2	B POWER TRANSFORMER T1	B POWER TRANSFORMER T2	C H.V. RECTIFIER ASSEMBLY WITH HVC HARNESS ASSEMBLY: H.V. RECTIFIER FOR MG1	C: H.V. RECTIFIER FOR MG2	C: ASYMMETRIC RECTIFIER FOR MG1	C: ASYMMETRIC RECTIFIER FOR MG2	C: H.V. HARNESS	D H.V. CAPACITOR C1	D H.V. CAPACITOR C2	E 1ST LATCH SWITCH SW1	E 2ND LATCH SWITCH SW2	E 3RD LATCH SWITCH SW3	E MONITOR SWITCH SW4	E STOP SWITCH SW5	F FUSE M8A F1	F FUSE M8A F2
ON CONDITION	EE 3 appears in display.	○	○	○	○	○	○	○	○	○	○	○	○	○	○			○	○
	EE 6 appears in display.																		
	EE 7 appears in display.																		
	EE 9 appears in display.																		
	Keys are touched but the programme can not be entered.																○		
	Both oven lamp and blower motor do not work.																		
	Only oven lamp does not work.																		
	Only blower motor does not work.																		
	Digital display shows cooking time is 0 or STOP/CLEAR key is touched but oven does not stop. (Oven lamp and blower motor does not work.)																		
	Home fuse blows when starting the oven.																		
	Oven goes into cook cycle but shuts down before end of cooking cycle. (Microwave power level is set in 10%.)																○		
	Oven seems to be operating but no heat is produced in oven load. (Microwave power level is set in 10%.)	○	○	○	○	○	○	○	○	○	○	○	○	○	○			○	○
	It passed more than 1 minute after cooking but oven lamp and blower motor go no working.																		

		○											13A SPECIAL FUSE F3	G
		○											FUSE F6.3A F4	H
	○											○	MG THERMO-CUT 145°C TC1	I
	○											○	MG THERMO-CUT 145°C TC2	I
		○											BLOWER MOTOR THERMAL TC3 CUT-OUT 115°C	I
		○											OVEN TEMP. FUSE 150°C TF	I
			○										SURGE RESISTOR R1	J
			○										SURGE RESISTOR R2	J
													MONITOR RESISTOR R3	J
			○										SURGE RELAY RY-1	K
			○										SURGE RELAY RY-2	K
		▷								○	○		THERMISTOR	L
						○							OVEN LAMP	
						○							OVEN LAMP SOCKET	
		▷			○							▷	BLOWER MOTOR	M
		○											NOISE FILTER	N
		○											POWER SUPPLY CORD	
		○											FUSE HOLDER	
		○											CORD CONNECTOR	
	○		○							○		○	SHORTED WIRE HARNESS	
	○	○			○	○		○			○	○	OPENED WIRE HARNESS	
○	○	○	○	○			○	○		○	○	○	TOUCH CONTROL PANEL	P
○	○		○	○			○					○	RELAY (RY1, 3, 4)	R
		○											FOIL PATTERN	S
	▷	▷								▷		▷	BLOCKED VENTILATION OPENINGS	
	▷	▷								▷		▷	BLOCKED BLOWER MOTOR	
	▷	▷						▷				▷	MIS ADJUSTMENTS OF SWITCHES	
		○	▷										HOME FUSE OR BREAKER	
		○											NO POWER AT WALL OUTLET	
									○				OVER THE MAX. COOKING TIME	
								○					DUE TO PROGRAMME LOCK	
										○			TEMPERATURE OF THERMISTOR IS HIGHER THAN 120°C	
										○			TEMPERATURE OF THERMISTOR IS HIGHER THAN 95°C IN 10 MINUTES AFTER STARTING THE OVEN.	

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST
A	MAGNETRON TEST

MICROWAVE OUTPUT POWER BY WAY OF IEC 705

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer casefitted).
Microwave output power from the magnetron can be measured by way of IEC 705, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used.
When P(W) heating works for t(second), approximately P x t/4.187 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises $\triangle T$ (°C) during this microwave heating period, the calorie of the water is V x $\triangle T$.

The formular is as follows;

$P \times t / 4.187 = V \times \triangle T$
$P\ (W) = 4.187 \times V \times \triangle T / t$

Our condition for the water load is as follows:
Room temperature ... around 20 °C, Power supply Voltage ... 225 volts.
Water load ... 1000 ml, Initial temperature ... 10 ±2 °C, Heating time .... 26sec.
$P = 160 \times \triangle T$

Measuring condition:
1. Container
   The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm.
2. Temperature of the oven and vessel
   The oven and the empty vessel are at ambient temperature prior to the start of the fest.
3. Temperature of the water
   The initial temperature of the water is (10 ± 2) °C.
4. Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5K.
5. Select stirring devices and measuring instruments in order to minimize addition or removal of heat.
6. The graduation of the thermometer must be scaled by 0.1 °C at minimum and an accurate thermometer.
7. The water load must be (1000 ± 5) g.
8. "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE The operation time of the microwave oven is "t + 2" sec. 2 sec is magnetron filament heat-up time.

Measuring method:
1. Measure the initial temperature of the water before the water is added to the vessel.

   Example: The initial temperature T1 = 11 °C

2. Add the 1 litre water to the vessel.
3. Place the load on the centre of the shelf.
4. Operate the microwave oven at HIGH for the temperature of the water rises by a value $\triangle T$ of (10 ± 2) K.
5. Stir the water to equalize temperature throughout the vessel.
6. Measure the final water temperature.

   Example: The final temperature T2 = 21 °C

7. Caluculate the microwave power output P in watts from above formula.

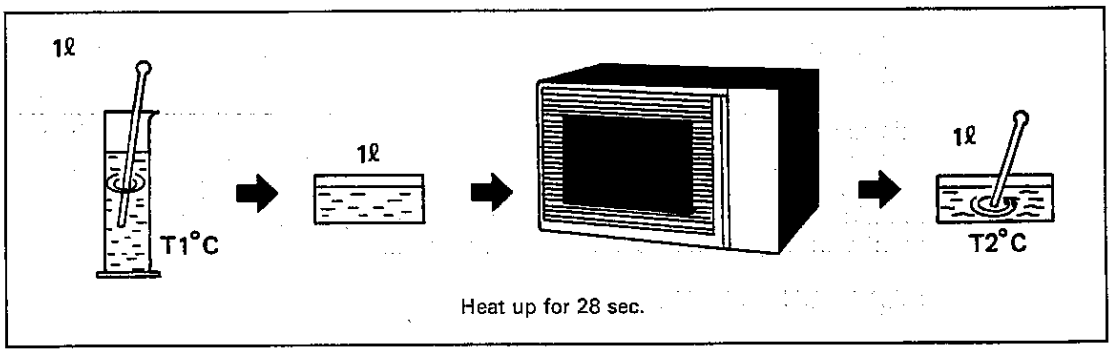
TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

Initial temperature	T1 = 11 °C
Temperature after (26 + 2) = 28 sec.	T2 = 21 °C
Temperature difference Cold-Warm	ΔT = 10 °C
Measured output power The equation is as follows: P= 160 x ΔT	P= 160 x 10 °C = 1600 Watts

JUDGMENT: The measured output power should be at least ±15 % of the rated output power.

CAUTION: 1 °C CORRESPONDS TO 160 WATTS.
REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



B **POWER TRANSFORMER TEST**

WARNING: High voltages and large currents are present at the secondary winding and filament winding of the power transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements at the high-vltage circuits, including the magnetron filament.

CARRY OUT 3D CHECKS.

Disconnect the leads to the primary winding of the power transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three windings. The following readings should be obtained :-

a. Primary winding ----------1.3 ohms approximately.
b. Secondary winding -------79 ohms approximately.
c. Filament winding ---------less than 1 ohm.

If the reading obtained are not as stated above, then the power transformer is probably faulty and should be replaced.

CARRY OUT 4R CHECKS

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST
C	**HIGH VOLTAGE RECTIFIER ASSEMBLY TEST**

HIGH VOLTAGE RECTIFIER TEST

CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is intinte in one direction and mor than 100 k Ω in the other direction.

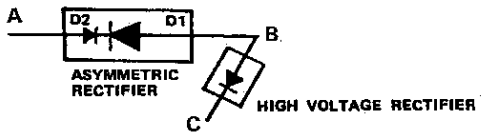
CARRY OUT 4R CHECKS

ASYMMETRIC RECTIFIER TEST

CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both directions then the asymmetric rectifier is good. If a asymmetric rectifier is shorted in either direction, then the the asymmetric rectifier is probably faultly and must be replaced with the high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage rectifier, high voltage wire or filament winding of the power transformer is shorted.

CARRY OUT 4R CHECKS



NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIRE, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLYAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

D	**HIGH VOLTAGE CAPACITOR TEST**

CARRY OUT 3D CHECKS.

A. Isolate the high voltage capacitor from the circuit.
B. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
C. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10 M Ω after it has ben charged.
D. A short-circuited capacitor shows continuity all the time.
E. An open capacitor constanlly shows a resistance about 10 M Ω because of its internal 10 M Ω resistance.
F. Whe the internal wire is opened in the high voltage capacitor, the capacitor shows an infinite resistance
G. The resistance across all the terminals and the chassis must be inifinte when the capacitor is normal.

If incorrect readings are obtained, the high voltage capacitor must be replaced.

CARRY OUT 4R CHECKS

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

E **SWITCH TEST**

CARRY OUT 3D CHECKS.

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	O.C.	S.C.
Depressed	S.C.	O.C.

COM; Common terminal, NO; Normally open terminal, NC; Normally closed terminal
S.C.; Short circuit, O.C.; Open circuit

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

CARRY OUT 4R CHECKS.

F **FUSE M8A F1 OR F2 TEST**

CARRY OUT 3D CHECKS.

If the fuse F1 or F2 is blown, there is a short in the asymmetric rectier or there is a ground in wire harness. A short in the asymmetric rectifier may be occured due to short or ground in H.V. rectifier, magnetron, power transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS

CAUTION: Only replace fuse with the correct value replacement.

G **13A SPECIAL FUSE F3 TEST**

CARRY OUT 3D CHECKS

If the special fuse F3 is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS

CAUTION: Only replace special fuse with the correct value replacement.

H **FUSE F6.3A F4 TEST**

CARRY OUT 3D CHECKS

If the fuse F4 F6.3A is blown when the door is opened, check the latch switch, monitor switch and monitor resistor.

If the fuse F4 F6.3A is blown by incorrect door switching replace the defective switch(s) and the fuse F42 F6.3A.

CARRY OUT 4R CHECKS

CAUTION: Only replace fuse with the correct value replacement.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

I TEMPERATURE FUSE OR THERMAL CUT-OUT TEST

CARRY OUT 3D CHECKS

Disconnect the leads from the terminals of the temp. fuse or thermal cut-out. Then using an ohmmeter, make a continuity test across the each two terminals as described in the table below.

CARRY OUT 4R CHECKS

Table: Temperature Fuse or Thermal Cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit). (°C)	Temperature of "OFF" condition (open circuit). (°C)	Indication of ohmmeter (When room temperature is approx. 20 °C.)
Oven temp. fuse 150 °C	This is not resetable type.	Above 150 °C	Closed circuit
MG thermal cut-out 145 °C	Below −20 °C	Above 145 °C	Closed circuit.
Blower motor thermal cut-out 115 °C	Below −20 °C	Above 115 °C	Closed circuit

If incorrect readings are obtained, replace the temp. fuse or thermal cut-out.

An open circuit MG thermal cut-out indicates that the magnetron has overheated, this may be due to resistricted ventilation, cooling fan failure or a fault condition within the magnetron or HV circuit.

An open circuit oven temp. fuse 150 °C indicates that the oven cavity has over heated, this may be due to no load operation.

An open circuit blower motor thermal cut-out 115 °C indicates the blower motor winding has overheated, this may be due to resisted ventilation or locked cooling fan.

J MONITOR RESISTOR AND SURGE RESISTOR TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the monitor resistor or surge resistor.
Using an ohmmeter and set on a low range.
Check between the terminals of the monitor resistor or surge resistor as described in the following table.

Table: Resistance

Resistor	Resistance
Monitor resistor	Approx. 3.6 Ω
Surge resistor	Approx. 10 Ω

If incorrect readings are obtained, replace the monitor resistor or surge resistor

CARRY OUT 4R CHECKS.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

K **SURGE RELAY TEST**

CARRY OUT 3D CHECKS

Disconnect the leads to terminals 1 and 6. connect an ohmmeter across the terminals 1 and 6, a reading of approximately 160 ohms should be indicated. If this is not the case then the relay coil is probably faulty and the relay should be replaced.

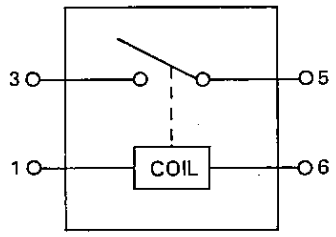
CARRY OUT 4R TESTS

Relay contact test for short circuit:

CARRY OUT 3D CHECKS

Isolate terminals 3 and 5 of the surge relay. Using an ohmmeter, check continuity between terminal 3 and 5. A reading of infinite resistance should be obtained. If this is not the case then the relay is probably faulty and should be replaced.

CARRY OUT 4R CHECKS



L **THERMISTOR TEST**

CARRY OUT 3D CHECKS

Disconnect connector-B from the CPU unit. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to the leads of the thermistor.

Room Temp.	Resistance
68 °F(20 °C) - 86 °F(30 °C)	Approx. 61.5k Ω - 39.5k Ω

If the meter does not indicate above resistance, replace the thermistor.

CARRY OUT 4R CHECKS

M **MOTOR WINDING TEST**

CARRY OUT 3D CHECKS

Disconnect the leads from the motor.
Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor

Motors	Resistance
Blower motor	Approximately 32 ohms

If incorrect readings are obtained, replace the motor.
(Also refer to test procedure " O ")

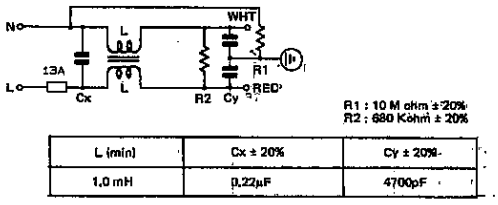
CARRY OUT 4R CHECKS

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST
N	**NOISE FILTER TEST**

CARRY OUT 3D CHECKS

Disconnect the leads from the terminals of the noise filter.
Using an ohmmeter, check between the terminals as described in the following table.



L (min)	Cx ± 20%	Cy ± 20%
1.0 mH	0.22μF	4700pF

MEASURING POINTS	INDICATION OF OHMMETER
Between N and L	Approximately 680k Ω
Between terminal N and WHITE	Short circuit
Between terminal L and RED	Short circuit

If incorrect readings are obtained, replace the noise filter unit. CARRY OUT 4R CHECKS

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST
P	**TOUCH CONTROL PANEL ASSEMBLY TEST**

The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into three units, Control Unit, Key Unit and LED Unit, troubleshooting by unit replacement is described according to the symptoms indicated.

1. Key Unit.

The following symptoms indicate a defective key unit. Replace the key unit.

a) When touching the pads, a certain pad produces no signal at all.
b) When touching the pads, sometimes a pad produces no signal.

2. Control Unit

The following symptoms indicate a defective control unit. Replace the control unit.

2-1 Programming problems.

a) When touching the pads, a certain group of pads do not produce a signal.

2-2 Display problems.

a) For a certain digit, all or some segments do not light up.
b) For a certain digit, brightness is low.
c) Only one indicator does not light up.
d) The corresponding segments of all digits do not light up; or they continue to light up.
e) Wrong figure appears.
f) A certain group of indicators do not light up.
g) The figure of all digits flicker.

2-3 Other possible problems caused by defective control unit.

a) Buzzer does not sound or continues to sound.
b) Cooking is not possible.

3. LED Unit

The following symptoms indicate a defective LED Unit. Replace the LED Unit.

a) When desired memory pad(example,No.1)is touched No.1, LED does not light or LEDs do not turn off.
b) None of the LEDs light up.
c) Only certain LEDs will not light up.

Q	**KEY UNIT TEST**

If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon is making good contact, verify that the door sensing switch (stop switch) operates properly; that is the contacts are closed when the door is closed and open when the door is open.

If the door sensing switch (stop switch) is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the door sensing switch is closed (either close the door or short the stop switch connecter). Use the key unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP/CLEAR pad making momentary contact. If the control unit responds by clearing with a beep, the key unit is faulty and must be replaced. If the control unit does not respond, it is faulty and must be replaced.

If a specific pad does not respond , the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.

R	**RELAY TEST**

CARRY OUT 3D CHECKS

Remove the outer case and check voltage between Pin Nos. 5 and 7(or9) of the connector (A) on the control unit with an A.C. voltmeter.
The meter should indicate the rated volts, if not check oven circuit.

RY1,RY3 and RY4 Relay Test

These relays are operated by D.C. voltage.
Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation.
DC. voltage indicated .....Defective relay.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

DC. voltage not indicated .....Check diode which is connected to the relay coil. If diode is good, control unit is defective.

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	Approx. 12 V.D.C.	Oven lamp and Cooling fan motor
RY3	Approx. 14 V.D.C.	Power transformer 1
RY4	Approx. 14 V.D.C.	Power transformer 2

CARRY OUT 4R CHECKS

S **PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN.**

To protect the electronic circuits, this model is provided with a fine foil pattern added to the primary on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

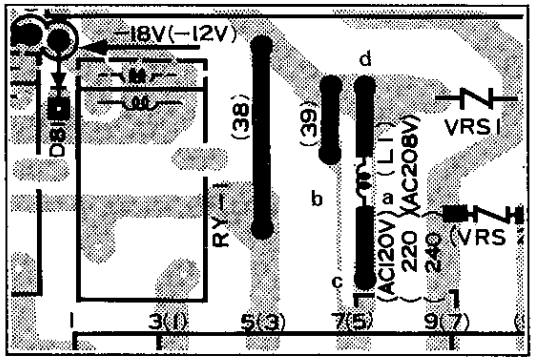
Problem: POWER ON, indicator does not light up.

CARRY OUT 3D CHECKS

Disconnect the leads from the primary of the power transformer. Make sure that the leads remain isolated from other oven components and chassis.(Use insulation tape if necessary.)
Reconnect the supply.

STEPS	OCCURANCE	CAUSE OR CORRECTION
1	The rated voltage is not applied to POWER terminal of CPU connector (CN-A)	Check supply voltage and oven power cord.
2	The rated voltage is applied to primary side of Power transformer.	Power transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire 39 and solder.(CARRY OUT 3D CHECKS BEFORE REPAIR)
4	Pattern at "a" and "b" are broken.	*Insert the coil RCILF2003YAZZ between "c" and "d".(CARRY OUT 3D CHECKS BEFORE REPAIR)

NOTE:* At the time of these repairs, make a visual inspection of the varistor for burn damage and test the T/C transformer with an ohmmeter for the presence of layer short-circuit (check primary coil resistance).
If any abnormal condition is detected, replace the defective parts.



CARRY OUT 4R CHECKS

TOUCH CONTROL PANEL ASSEMBLY:

Outlines of Touch Control Panel

The touch control section consists of the following units as shown in the touch control panel circuit.

(1) Control unit.
(2) Key unit.
(3) LED unit.

The principal function of these units and the signals communicated among them are explained below.

1-1 Control unit

Signals of LED, key touch and oven function control are all precessed by one microcomputer.

1) Power Supply Circuit:
This circuit changes output voltage at the secondary side of power transformer to voltages reguired at each part by all wave rectifying circuit, constant voltage circuit, etc.

2) ACL Circuit:
This is an Auto-clear Circuit, i.e., a reset circuit, which enables IC1 to be activated from initial state upon closing power supply circuit.

3) Power SYNC Signal Generating Circuit:
This is a circuit for generating power SYNC signal by virtue of the secondary side output power transformer. This signal is used for a basic frequency to time processing and so on.

4) Clock Circuit:
This is a circuit for controlling clock frequency required for operating IC1.

5) IC1 (Main Processor):
This is a one-chip microcomputer, responsible of controlling the whole controller.

6) IC3 (Memory Processor):
This is a memory IC, responsible of memory function.

7) Display Circuit:
This is a circuit for driving display tubes by IC1 output.

8) Key Input Circuit:
This is a circuit for transmitting key input information to IC1.

9) Sound-body Driving Circuit:
This is a circuit for driving sound body by IC1 output.

10) Relay Driving Circuit:
This is a circuit for driving output relay by IC1 output.

11) Stop SW Circuit:
This is a circuit for driving IC1 to detect door opening/closing.

12) Exhaust Gas Temperature Detecting Circuit:
This is a circuit for transmitting output change of thermistor (Temperature Sensor) to IC1.

13) Magnetron Trouble-shooting Circuit
This is a circuit for detecting troubles at magnetron and high voltage circuit by current change at the primary side current of high voltage transformer at main body side.

1-2 Key unit

The key unit is composed of a matrix circuit in which when a key is touched, one of signals P11~P17 generated by the LSI, is passed through the key and returned to the LSI as one of signals R0—R3.
This model has 10 Memory pads.
When the oven is shipped, Memory pad 1 to 0 are set as follows: fig 1

Memory pad No.	FORMULA	POWER	Memory pad No.	FORMULA	POWER
1	5 sec	100%	6	50 sec	100%
2	10 sec	100%	7	60 sec	100%
3	20 sec	100%	8	75 sec	100%
4	30 sec	100%	9	90 sec	100%
5	40 sec	100%	0	2 min	100%

(fig 1)

This model have double quantity pad.
When the oven is shipped, Magnification "1.8" is preset in double quantity pad.
This model have express defrost pad.
When the oven is shipped, express defrost is set as follows: fig2..

	1 STAGE	2 STAGE	3 STAGE
FORMULA	P=0.99T+90	P=0	P=0
POWER	10%	—	—
OVEN ON/OFF	—	—	—

T: TTL COOKING TIME

(fig 2)

1-3 LED unit

This unit has 10 LEDs corresponding to the 10 Memory pads.

2. DESCRIPTION OF LSI AND IC'S

2-1. LSI (IC1: IZA324DR)

The I/O signals of the LSI (IZA324DR) are detailed in the following tables.

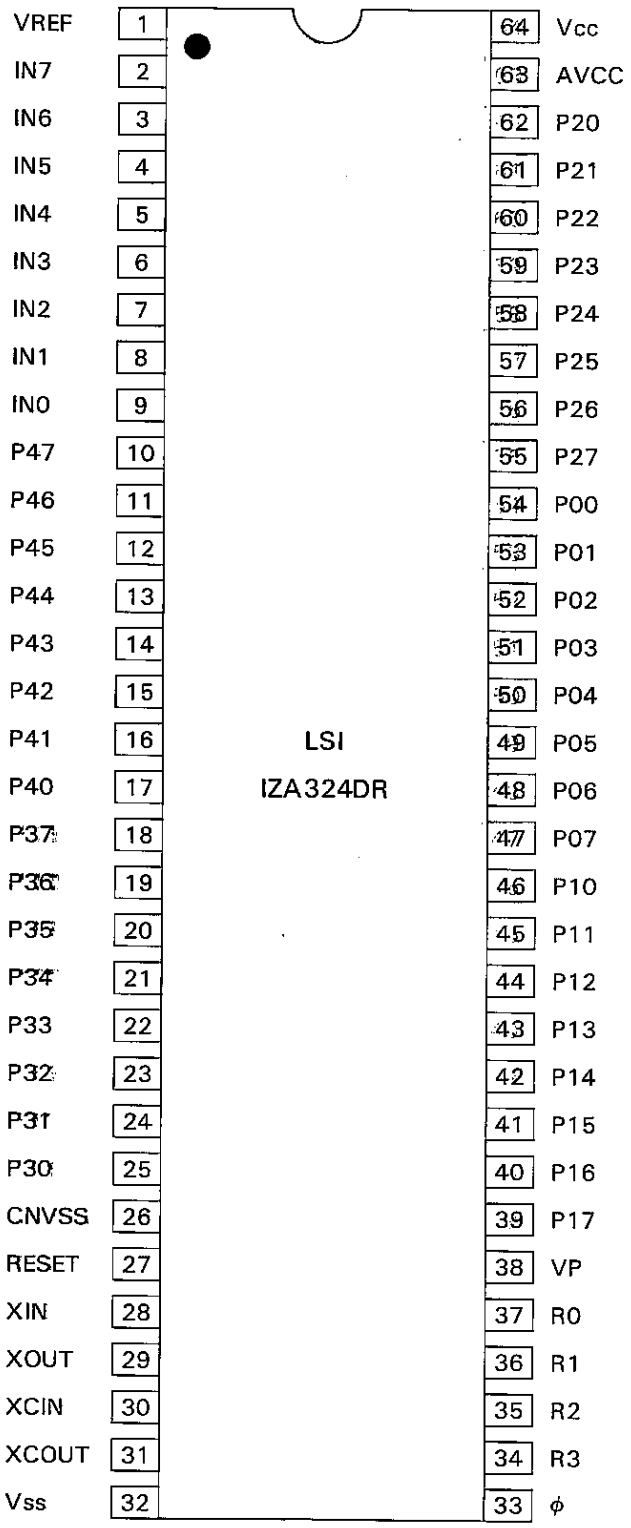
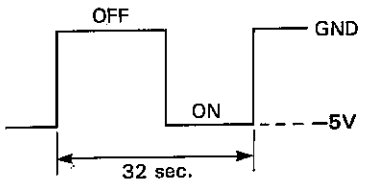


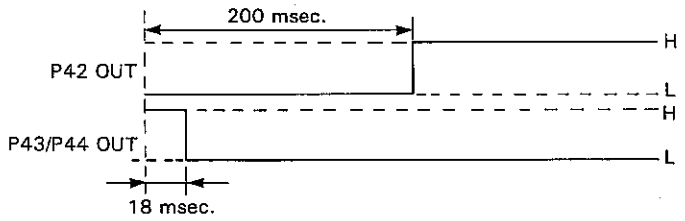
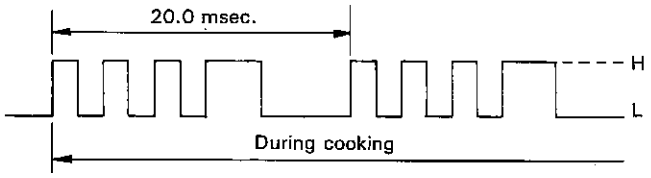
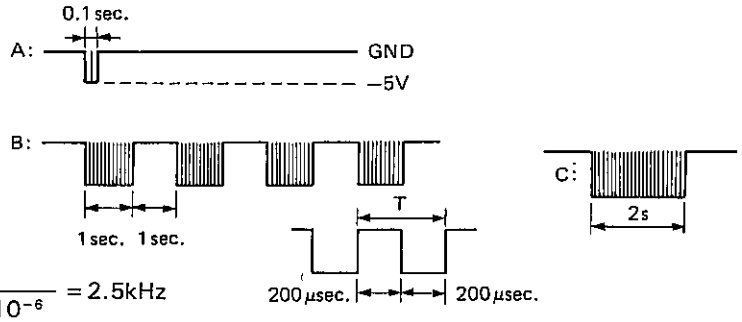
Figure T-1 Relationship between pin Nos. and Signals (LSI: IZA324DR)

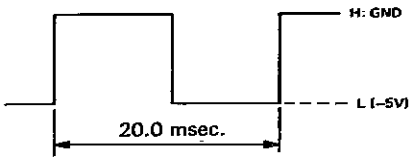
DESCRIPTION OF LSI

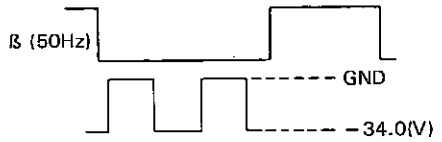
LSI (IZA324DR)

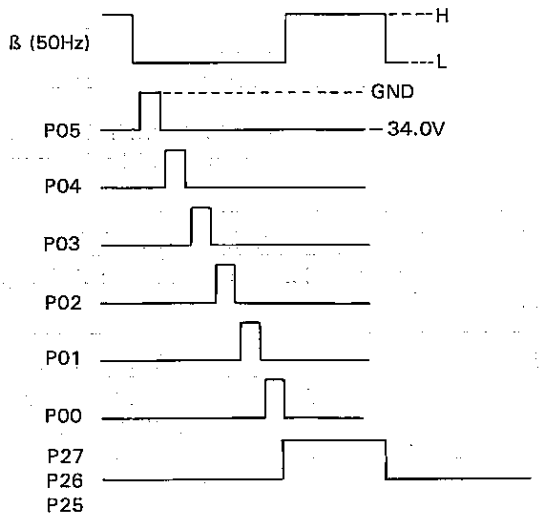
The I/O signal of the LSI (IZA324DR) is detailed in the following table.

<table>
<tr><th>Pin No.</th><th>Signal</th><th>I/O</th><th>Description</th></tr>
<tr><td>1</td><td>VREF</td><td>IN</td><td>Reference voltage input terminal.
A reference voltage applied to the A/D converter in the LSI.
Connected to GND. (0V)</td></tr>
<tr><td>2</td><td>IN7</td><td>IN</td><td>Memory (EEPROM) data input.</td></tr>
<tr><td>3</td><td>IN6</td><td>IN</td><td>Temperature measurement input: OVEN THERMISTOR.
By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.</td></tr>
<tr><td>4</td><td>IN5</td><td>IN</td><td>A/D input for troubleshooting Magnetron 1.</td></tr>
<tr><td>5</td><td>IN4</td><td>IN</td><td>Terminal to change functions according to the model.
Signal in accordance with the model in operation is applied to set up its function.</td></tr>
<tr><td>6</td><td>IN3</td><td>IN</td><td>A/D input for troubleshooting Magnetron 2.</td></tr>
<tr><td>7</td><td>IN2</td><td>IN</td><td>Connected to GND. (0V)</td></tr>
<tr><td>8</td><td>IN1</td><td>IN</td><td rowspan="2">Terminal not used.</td></tr>
<tr><td>9</td><td>IN0</td><td>IN</td></tr>
<tr><td>10</td><td>P47</td><td>OUT</td><td>Memory (EEPROM) data output.</td></tr>
<tr><td>11</td><td>P46</td><td>OUT</td><td>Memory (EEPROM) clock ouput.</td></tr>
<tr><td>12</td><td>P45</td><td>OUT</td><td>Memory (EEPROM) select output.</td></tr>
<tr><td>13</td><td>P44</td><td>OUT</td><td rowspan="2">Magnetron high-voltage circuit driving signal.
To turn on and off the cook relay.
In 100% power level operation, "L" level during cooking; "H" level otherwise.
In other power level operation (90, 80, 70, 60, 50, 40, 30, 20, 10 or 0%), "H" and "L" level is repeated according to power level.
<table>
<tr><th>Power level</th><th>ON</th><th>OFF</th></tr>
<tr><td>100%</td><td>32 sec.</td><td>0 sec.</td></tr>
<tr><td>90</td><td>30</td><td>2</td></tr>
<tr><td>80</td><td>26</td><td>6</td></tr>
<tr><td>70</td><td>24</td><td>8</td></tr>
<tr><td>60</td><td>22</td><td>10</td></tr>
<tr><td>50</td><td>18</td><td>14</td></tr>
<tr><td>40</td><td>16</td><td>16</td></tr>
<tr><td>30</td><td>12</td><td>20</td></tr>
<tr><td>20</td><td>8</td><td>24</td></tr>
<tr><td>10</td><td>6</td><td>26</td></tr>
<tr><td>0</td><td>0</td><td>32</td></tr>
</table>

</td></tr>
<tr><td>14</td><td>P43</td><td>OUT</td></tr>
</table>

Pin No.	Signal	I/O	Description
15	P42	OUT	**Surge limiting relay driving signal.** The surge limiting relay is designed to turn on 18 msec. earlier than the cook relays (RY3, RY4). 
16	P41	OUT	**Power supply output at thermistor detecting circuit.** (Output —5V in cooking only, but apply high impedance to others to prevent thermistor from electrolytic corrosion ocurrence.)
17	P40	OUT	**Oven lamp and Fan motor driving signal (Square waveform: 50Hz).** To turn on and off shut-off relay (RY1). The Square waveform voltage is delivered to the RY1 driving circuit and relays (RY3, RY4 COOK RELAY) control circuit. 
18	P37	OUT	Terminal not used.
19	P36	OUT	
20	P35	OUT	
21	P34	OUT	
22	P33	OUT	
23	P32	OUT	**Signal to sound buzzer.** This signal is to control the 2.5 KHz continuous signal. A: Key touch sound. B: Guydance sound. C: Completion sound.  $f = \frac{1}{T} = \frac{1}{400 \times 10^{-6}} = 2.5\text{kHz}$

Pin No.	Signal	I/O	Description
24	P31	IN	**Signal synchronized with commercial power source frequency.** This is the basic timing for all time processing of LSI. 
25	P30	OUT	Terminal not used.
26	CNVSS	IN	Connected to Vc. (−5V)
27	RESET	IN	**Auto-clear terminal.** Signal is input to reset the LSI to the initial state when power is supplied. Temporarily set to "L" level the moment power is supplied, at this time the LSI is reset. Thereafter set at "H" level.
28	XIN	IN	**Internal clock oscillation frequency setting input.** The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal.
29	XOUT	OUT	**Internal clock oscillation frequency control output.** Output to control oscillation input of XIN.
30	XCIN	IN	Terminal not used.
31	XCOUT	OUT	
32	Vss	IN	**Power source voltage: −5V.** VC voltage of power source circuit input.
33	ϕ	OUT	Terminal not used.
34	R3	IN	**Signal coming from touch-key.** When either one of G-12 line keys on key matrix is touched, a corresponding signal out of P11−P17 will be input into R3. When no key is touched, the signal is held at "L" level.
35	R2	IN	**Signal similar to R3.** When either one of G-11 line keys on key matrix is touched, a corresponding signal will be input into R2.
36	R1	IN	**Signal similar to R3.** When either one of G-10 line keys on key matrix is touched, a corresponding signal will be input into R1.
37	R0	IN	**Signal similar to R3.** When either one of G-9 line keys on key matrix is touched, a corresponding signal will be input into R0.
38	VP	IN	**Anode (segment) of Fluorescent Display light-up voltage: −34V** VP voltage of power source circuit input.

Pin No.	Signal	I/O	Description
39	P17	OUT	**1) Segment and LED (No.1) data signals.** The relation between signals and LED's and indicators are as follows: Signal — Segment/LED No. / Signal — Segment/LED No. P17 ..... LB/No.1 / P07 ..... b /No.9 P16 ..... UB/No.2 / P06 ..... a /No.0 P15 ..... h /No.3 P14 ..... g /No.4 P13 ..... f /No.5 P12 ..... e /No.6 P11 ..... d /No.7 P10 ..... c /No.8  **2) Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to R0 — R3 terminal while one of G-6 line keys on key matrix is touched.
40	P16	OUT	**1) Segment and LED (No.2) data signals.** Signal similar to P17. **2) Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to R0 — R3 terminal while one of G-5 line keys on key matrix is touched.
41	P15	OUT	**1) Segment and LED (No.3) data signals.** Signal similar to P17. **2) Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to R0 — R3 terminal while one of G-4 line keys on key matrix is touched.
42	P14	OUT	**1) Segment and LED (No.4) data signal.** Signal similar to P17.
43	P13	OUT	**Segment and LED (No.5) data signal.** Signal similar to P17.
44	P12	OUT	**1) Segment and LED (No.6) data signal.** Signal similar to P17. **2) Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to R0 — R3 terminal while one of G-8 line keys on key matrix is touched.

Pin No.	Signal	I/O	Description
45	P11	OUT	**1) Segment and LED (No.7) data signal.** Signal similar to P17. **2) Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to R0 — R3 terminal while one of G-7 line keys on key matrix is touched.
46	P10	OUT	**Segment and LED (No.8) data signal.** Signal similar to P17.
47	P07	OUT	**Segment and LED (No.9) data signal.** Signal similar to P17.
48	P06	OUT	**Segment and LED (No.0)** Signal similar to P17.
49	P05	OUT	**Digit selection signal.** The relation between digit signal and digit are as follows: Digit signal ..... digit P05 ..... 1st P04 ..... 2nd P03 ..... 3rd Digit signal ..... digit P02 ..... 4th P01 ..... 5th P00 ..... 6th P27 ..... LED COMMON P26 ..... LED COMMON P25 ..... LED COMMON Normally, one pulse is output in every ß period, and input to the grid of the Fluorescent Display. 

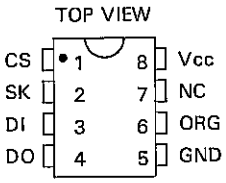
<table>
<tr><th>Pin No.</th><th>Signal</th><th>I/O</th><th>Description</th></tr>
<tr><td>50</td><td>P04</td><td>OUT</td><td rowspan="8"><u>Digit selection signal.</u>
Signal similar to P05.</td></tr>
<tr><td>51</td><td>P03</td><td>OUT</td></tr>
<tr><td>52</td><td>P02</td><td>OUT</td></tr>
<tr><td>53</td><td>P01</td><td>OUT</td></tr>
<tr><td>54</td><td>P00</td><td>OUT</td></tr>
<tr><td>55</td><td>P27</td><td>OUT</td></tr>
<tr><td>56</td><td>P26</td><td>OUT</td></tr>
<tr><td>57</td><td>P25</td><td>OUT</td></tr>
<tr><td>58</td><td>P24</td><td>OUT</td><td>Terminal not used.</td></tr>
<tr><td>59</td><td>P23</td><td>OUT</td><td><u>(Sound) Volume Level Control Terminal.</u>
This terminal (P-23) is to control volume level of buzzer sound with terminals, P22 and P21. Since the volume level of buzzer sound depends on voltage energized, it is controllable in 5 steps by combining signal levels for P23, P22 and P21.
Relationship of signal level combination to sound volume level is shown in the following table. ① ~ ⑤ in the table, however, are indicated in the descending order from the maximum level of sound volume through the minimum level.

Table
<table>
<tr><th>Sound Volume</th><th>P21</th><th>P22</th><th>P23</th><th>P32</th></tr>
<tr><td>① (max.)</td><td>L</td><td>L</td><td>L</td><td rowspan="5">*</td></tr>
<tr><td>②</td><td>H</td><td>L</td><td>L</td></tr>
<tr><td>③</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>④</td><td>L</td><td>L</td><td>H</td></tr>
<tr><td>⑤ (min.)</td><td>H</td><td>H</td><td>H</td></tr>
</table>
* At Output terminal P32, rectangular wave signal of 2.5 KHz is output.

 
ⓐ ① (Max) 34.0V
② 23.6V
③ 18.8V
④ 10.7V
⑤ 7.3V</td></tr>
<tr><td>60</td><td>P22</td><td>OUT</td><td rowspan="2"><u>Sound level control signal.</u>
Refer to above signal P23 (pin No. 59)</td></tr>
<tr><td>61</td><td>P21</td><td>OUT</td></tr>
<tr><td>62</td><td>P20</td><td>IN</td><td><u>Input signal which communicates the door open/close information to LSI.</u>
Door close; "H" level signal (0V)
Door opened; "L" level signal (−34V)</td></tr>
<tr><td>63</td><td>AVCC</td><td>IN</td><td>Connected to GND.</td></tr>
<tr><td>64</td><td>Vcc</td><td>IN</td><td>Connected to GND.</td></tr>
</table>

2-2 Memory IC (IC3)

CAT 35C102 is a 2K-bit, serial memory, enabling CMOS to be erased/written electrically. This memory is constructed with 128 registers X 16 bits, enabling individual access, read and write operations to be performed. Details of input/output signal for IC3 are as shown in the following diagram.



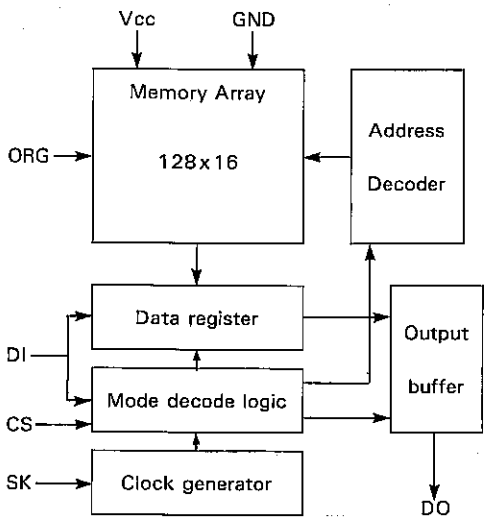
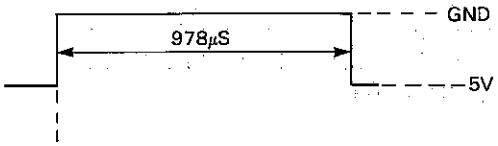
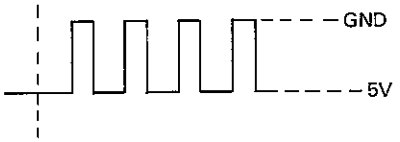
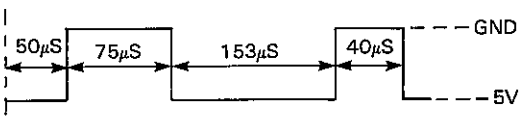
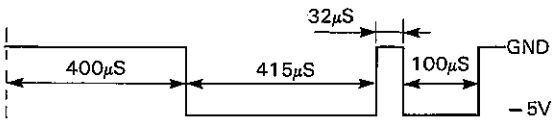


Figure T-2 Relation between Pin Nos. and Signals

Pin No.	Signal	I/O	Description
1	CS	OUT	Chip Select: accepts data input at HI. 
2	SK	IN	Clock Signal Input inputs/outputs serial data at every one pulse. 
3	DI	IN	Serial data input: receives instruction and data from IC1. 

Pin No.	Signal	I/O	Description
4	DC	OUT	**Serial data output: outputs data to IC1.** 
5	GND	IN	Connected to Vc. (−5V)
6	ORG	IN	Connected to GND.
7	NC	IN	Terminal not used.
8	Vcc	IN	Connected to GND.

3 Magnetron Trouble-shooting Circuit

This is a circuit for detecting troubles of magnetron along with high voltage circuit at the main body side by variation of the current flowing in high voltage transformer at the main body side.

During heating, flows the primary side current of high voltage transformer in current transformers T2 or T3. Then, generated in the secondary sides of current transformers in AC voltage, which is determined by R61 or R62. Execute halfwave rectification of the secondary side AC current at D63 or D64, and then smooth it at C63 or C64 to input to IN3 or IN5 ports of IC1.

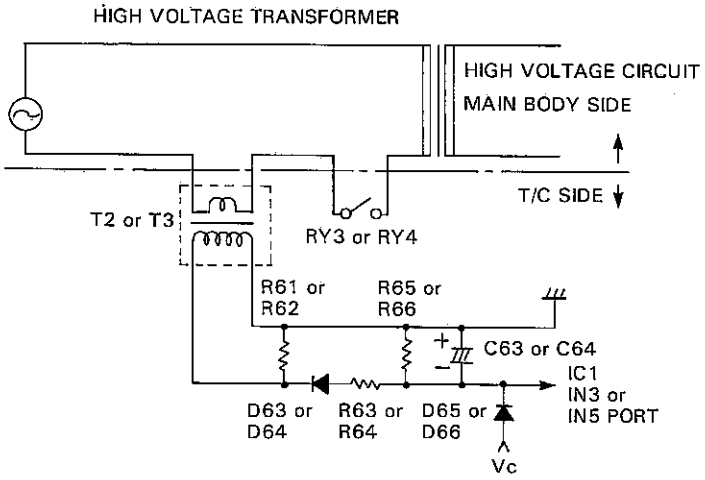


Figure T-3 Magnetron Trouble-shooting Circuit

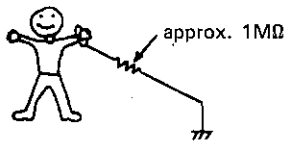
SERVICING

1. Precautions for Handling Electronic Components

This unit used PMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed.

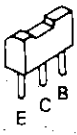
PMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charged in clothes, etc, and sometimes it is not fully protected by the built-in protection circuit.

1) When storing and transporting, thoroughly wrap them in aluminum foil.
   Also wrap PW boards containing them in aluminum foil.
2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Shapes of Electronic Components

Transistor
2SB793



Transistor
2SA1561TL

Transistor
DTA143ES
DTA114YS
DTD143ES
DTB143ES

3. Servicing of Touch Control Panel

We describe the procedures to permit servicing the touch control panel of the microwave oven and the caution you must consider when doing so.

To carry the servicing, power supply to the touch control panel is available either from the power line of the oven proper itself of from an external power source.

(1) Servicing the touch control panel with power supply from the oven proper:

CAUTION:

THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL ALIVE TO GIVE YOU DANGER DURING SERVICING.

Therefore, when checking the performance of the touch control panel, put the outer cabinet on the oven proper to keep you from touching the high tension transformer, or unplug the primary terminal (connector) of the high power transformer to turn it off; and the end of such connector shall be insulated with an insulating tape. After servicing, be sure to replace the leads to their original locations.

A. On some models, the power supply cord between the touch control panel and the oven proper is so short that they can't be separated from each other.
   For those models, therefore, check and repair all the controls (with the sensor-related ones included) of the touch control panel while keeping it in contact with the oven proper.

B. On some models, on the other hand, the power supply cord between the touch control panel and the oven proper is so long that they may be separated from each other. For those models, therefore, it is allowed to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to that with the oven door being closed.
   As to the sensor-related controls of the touch control panel, their checking is allowed if the dummy resistor(s) whose resistance is equal to that of those controls is used.

(2) Servicing the touch control panel with power supply from an external power source:
   Disconnect the touch control panel completely from the oven power, and short both ends of the door sensing switch (on PWB) of the touch control panel, which brings about such an operational state that is equivalent to that with the oven door being closed. And connect an external power source to the power input terminal of the touch control panel, and then it is allowed to check and repair the controls of the touch control panel; as in the case of (1) B above, it is here also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

4. Servicing Tools

Tools required when servicing the touch control panel assembly.

1) Soldering: 30W
   (To prevent leaking current, it is recommended to use a soldering iron with grounding terminal.)
2) Oscilloscope: Single beam, frequency range: DC — 10MHz type or more advanced model
3) Others: Hand tools

5. Other Precautions

1) When turning on the power source of the control unit, remove the aluminum foil applied for preventing static electricity.
2) Connect the connectors of the indicator and key units to the control unit taking care that the lead wires are not twisted.
3) After aluminum foil is removed, take extra care that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
4) Attach connectors, electrolytic capacitors, etc. to PW board, taking care that all connections are tight.
5) Be sure to use specified components where high precision is required.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

1. CARRY OUT 3D CHECKS.
2. Make sure that a definite "click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position, then pull the door release lever with one hand, this causes the latch heads to rise, it is then possible to hear a "click" as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.

Do not operate the oven if any of the following conditions exist;

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal is damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:
1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

Please refer to 'OVEN PARTS, CABINET PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

OUTER CASE REMOVAL

To remove the outer case, proceed as follows.
1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the screws from rear and along the side edge of case.
4. Slide the entire case back about 1 inch (3cm) to free it from retaining clips on the cavity face plate.
5. Lift the entire case from the oven.
6. Remove the screws holding the rear cabinet to the oven.
7. Remove the rear cabinet.
8. Discharge the HV capacitor before carring out any further work.
9. Do not operate the oven with the outer case removed.

N.B.; Step 1,2 and 8 form the basis of the 3D checks.

CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFOR TOUCHING ANY OVEN COMPONENTS OR WIRING.

HIGH VOLTAGE COMPONENTS REMOVAL (HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY)

To remove the components, proceed as follows.
1. CARRY OUT 3D CHECKS
2. Remove two (2) screws holding earth side terminals of high voltage rectifier assemblies.
3. Remove two (2) screws holding capacitor holder to rear cabinet and remove the capacitor holder.
4. Disconnect all the leads and terminals of high voltage rectifier assembly from high voltage capacitor.
5. Now, high voltage rectifier assembly should be free.

CAUTION
1. DO NOT REPLACE ONLY HIGH VOLTAGE RECTIFIER. WHEN REPLACE IT, REPLACE HIGH VOLTAGE RECTIFIER ASSEMBLT.
2. WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CHASSIS WITH A EARTHING SCREW.

6. Remove the H.V. cover from the two (2)high voltage capacitors.
7. Now, the two (2)high voltage capacitors are free.

MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Carry out item 2 to item 16 of "POWER TRANSFORMER AND BLOWER MOTOR REMOVAL".
3. Remove the four (4) screws holding the magnetron to the oven cavity. Remove the magnetron from the oven cavity.
4. Now, the magnetron is free.

CAUTION: WHEN REPLACE THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS TIGHEND SECURELY.

POWER TRANSFORMER AND BLOWER MOTOR REMOVAL BLOWER MOTOR

1. CARRY OUT 3D CHECKS.
2. Remove the clip holding the magnetron duct cover.
3. Remove the magnetron cover.
4. Disconnect the wire leads from the blower motor and the blower motor thermal cut-out.
5. Remove the single (1) screw holding the blower motor to the oven cavity.
6. Release the HVC harness from the purse lock on the blower motor.
7. Remove the blower motor. Now, the blower motor is free.

POWER TRANSFORMER

8. Remove the single (1) screw holding the air guide C to the oven cavity.
9. Remove the air guide C from the oven cavity.
10. Remove the single (1) screw holding the stirrer duct to the oven cavity.
11. Remove the stirrer duct from the oven cavity.
12. Disconnect the wire leads from the power transformer.
13. Disconnect the wire leads from the magnetron filament.
14. Release the wire leads from the hook of the air duct.
15. Remove the single (1) screw holding the air duct to the oven cavity.
16. Remove the air duct from the oven cavity.
17. Remove the two (2) screws holding the power transformer to the bottom plate.
18. Remove the power transformer. Now, the power transformer is free.

CAUTION:	WHEN THE NEW BLOWER MOTOR IS INSTALLED TWO PURSE LOCKS MUST BE FITTED IN IT BECAUSE IT DOES NOT HAVE ANY PURSE LOCKS.

CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL

The complete control panel should be removed for replacement of components. To remove the control panel, proceed as follows:

1. CARRY OUT 3D CHECKS
2. Disconnect oven from power supply.
3. Remove two(2) screws holding the control panel to the bottom oven cavity.
4. Pull down the control panel and remove it forward.
5. Disconnect two connectors(A),(B) and TAB terminal(TAB1,2,3,4) from the control unit.

Replacement of individual component is as follows:

CONTROL UNIT

1. Disconnect connector (F) from the control unit.
2. Disconnect connector (G) from the control unit by pushing the hooks of cable holder inwardly.
3. Remove four(4) screws holding the control unit to the panel frame assembly.
4. Push down the right side two(2) hooks fixing the control unit to the panel frame assembly, and lift up the control unit upward.

LED UNIT

1. Remove control unit. (Refer to above control unit)
2. Remove two(2) screws holding the LED unit to the panel frame assembly.
3. Remove the LED unit upward.

CONTROL PANEL FRAME (WITH KEY)

1. Remove two(2) screws holding the control panel mounting angle to the panel frame.
2. Lift up the control panel mounting angle from the panel frame.

CAUTION:
At installing control panel unit parts to main body set:

1. Ensure the installation of wiring-related parts without negligence.
2. When inserting key cable to main body set, ensure them free from caught-in trouble.In additio, when installing the parts to base plate with screws, be sure of pushing the control panel unit upward to fix with screws firmly.

OVEN LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS
2. Remove the oven lamp.
3. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the flat type small screw driver.
4. Lift up the oven lamp socket.
5. Now, the oven lamp socket is free.

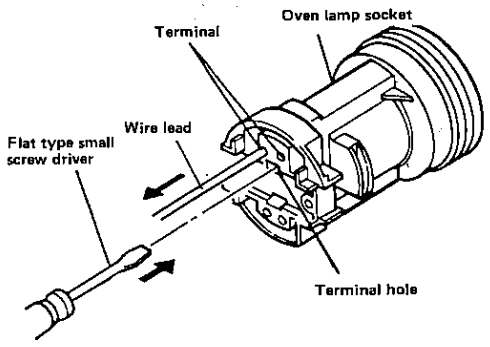


Figure C-1. Oven lamp socket

POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS
2. Loosen the two (2) screwes holding the brown and blue wires of the power supply cord to the cord connector.
3. Loosen the single (1) screw holding the earth angle and earth wire of power supply cord.
4. Remove the single (1) screw and nut holding the cord anchorages to the unit chassis.
5. Remove the power supply cord.

Re-install

1. Insert the power supply cord into the cord anchorages.
2. Insert the brown and blue wires of power supply cord into the terminals of cord connector, referring to pictorial disgram. And tight the screws of it.
3. Insert the green/yellow wire of power supply cord into the earth angle, and tight the screw holding the earth angle.
4. Re-install the cord anchorage(upper) to the noise filter angle with the one(1) screw.
5. CARRY OUT 4R CHECKS.

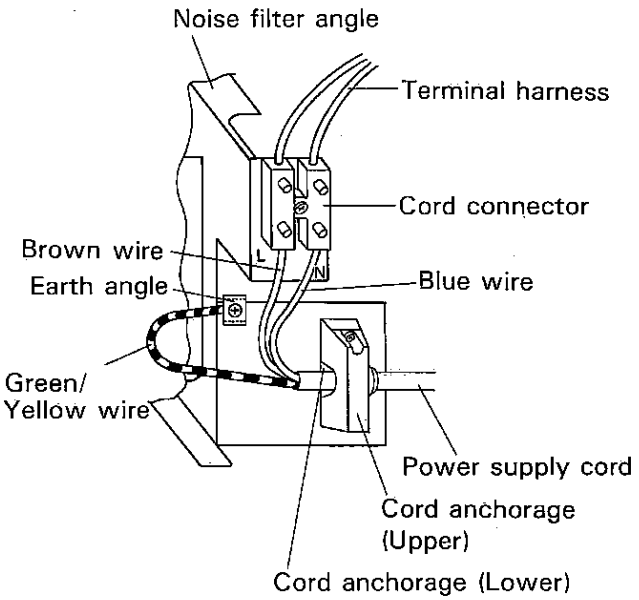


Figure C-2. Power supply cord replacement

1ST LATCH, 2ND LATCH, 3RD LATCH, MONITOR, AND STOP SWITCHES REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel from the oven cavity referring to "CONTROL PANEL REMOVAL".
3. Remove the two (2) screws holding the latch hook to the oven cavity.
4. Open the door and pull the latch hook out of the oven cavity.
5. For 1st latch, 2nd latch or Monitor switch removal

5-1. Disconnect the wire leads from the switch.

5-2. Push the retaining tabs outward slightly and then pull the switch forwards and remove it from the latch hook.

6. For 1st latch and stop switches removal

6-1. Disconnect the wire leads from the 1st latch and stop switches.

6-2. Remove the single (1) screw and nut holding the 1st latch and stop switches to the latch hook.

CAUTION:	WHEN THE 1ST LATCH SWITCH AND STOP SWITCH ARE INSTALLED, THE TWO (2) TABS OF THE LATCH HOOK SHOULD BE BROKEN.

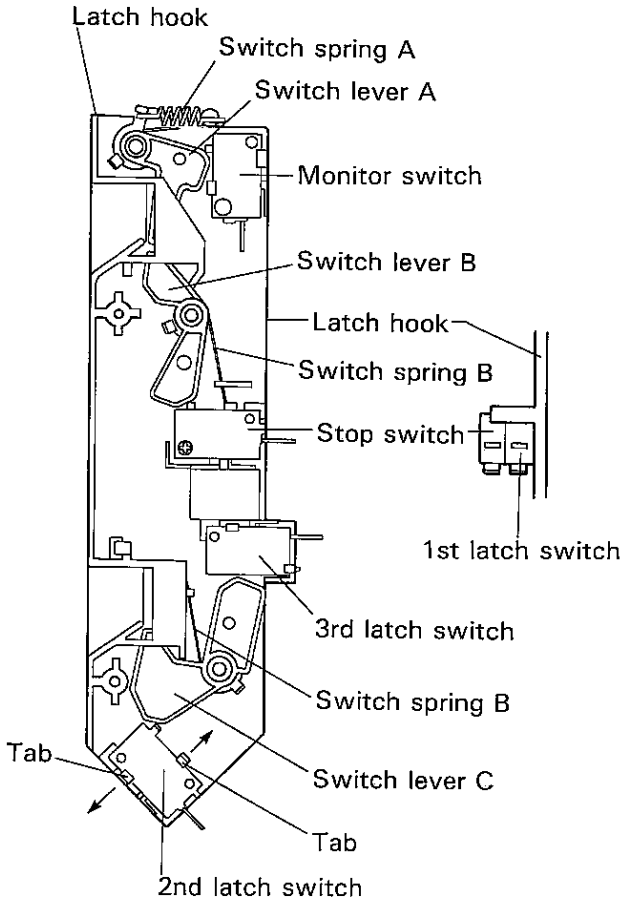


Figure C-3. How to remove the switch

1ST, 2ND, 3RD LATCH SWITCH, STOP SWITCH AND MONITOR SWITCH ADJUSTMENT

In case 1st latch switch, 2nd latch, stop switch, 3rd latch switch and monitor switch do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. Loosen the two (2) screws holding the latch hook.
2. With the door closed, adjust the latch hook by moving it back and forward, or up and down. In and out play of the door allowed by the latch hook should be less than 0.5 mm.
   The vertical position of the latch hook should be placed where the stop switch and 1st, 2nd, 3rd latch switches have activated with the door closed. The horizontal position of the latch hook should be placed where the monitor switch has activated with the door closed.
3. Secure the screws with washers firmly.
4. Make sure of the 1st, 2nd, 3rd latch switches, stop switch, and monitor switch operation. If those switches have not activated with the door closed, loose two (2) screws holding latch hook and adjust the latch hook position.

After adjustment, make sure of the following:

1. The stop switch and 1st, 2nd, 3rd latch switches interrupt the circuit before the door open when the door release lever is pulled, and then and monitor switch close the circuit when the door is opened.
2. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

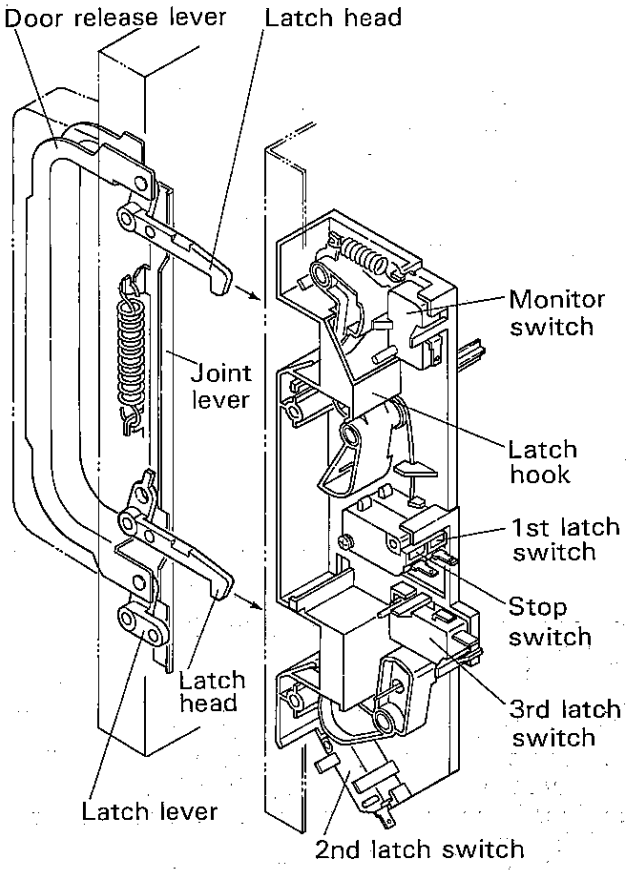
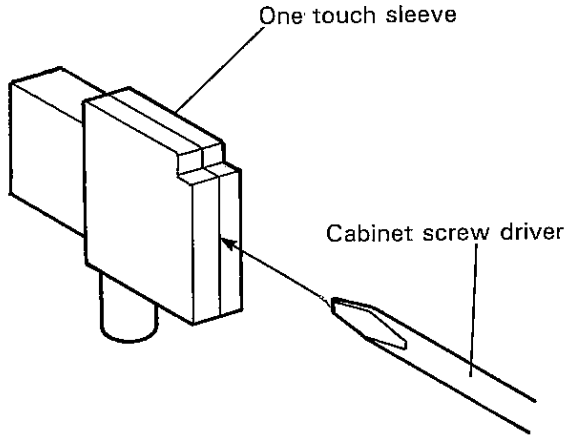


Figure C-4. Latch Switch Adjustments

ONE TOUCH SLEEVE REPLACEMENT

Removal

1. Insert the cabinet screwdriver into the gap of the ONE TOUCH SLEEVE as shown in the figure.
2. Break open the ONE TOUCH SLEEVE with the cabinet screwdriver.
3. Remove the ONE TOUCH SLEEVE from a receptacle.
4. Now, the ONE TOUCH SLEEVE is free.

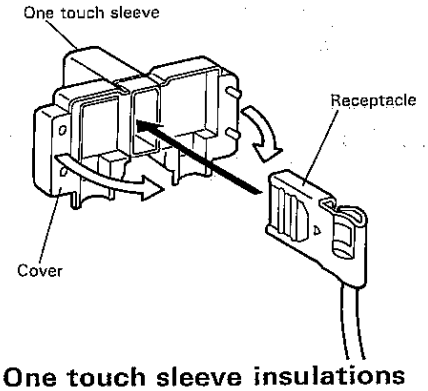


One touch sleeve removal

Installation

5. Insert a receptacle into an ONE TOUCH SLEEVE as shown in the figure.
6. Close the covers as shown in the figure.
7. Now, the ONE TOUCH SLEEVE is installed.

CAUTION	DO NOT USE THE ONE TOUCH SLEEVE AGAIN WHICH HAS REMOVED ONCE, BECUASE THE INSULATION FUNCTION OF IT WILL BE LOST.



One touch sleeve insulations

DOOR REPLACEMENT AND ADJUSTMENT

DOOR REPLACEMENT

1. CARRY OUT 3D CHECKS
2. Remove four (4) screws holding the upper and lower oven hinge to the oven cavity.
3. Remove door assembly with upper and lower oven hinges by pulling it forward.
4. On re-installing new door assembly, secure the upper and lower oven hinges with the four (4) mounting screws to the oven cavity. Make sure the door is parallel with bottom line of the oven face plate and the latch head pass through the latch holes correctly.
5. CARRY OUT 4R CHECKS

Note: After any service to the door, the approved microwave survey meter should be used to assure in compliance with proper microwave radiation standards. (Refer to Microwave Measurement Procedure.)

DOOR ADJUSTMENT

When removing and/or loosening hinges such as in door replacement, the following adjustment criteria are taken. Door is adjusted to meet the following three conditions by keeping screws of hinge loose.

1. Adjust door latch heads at a position where they smoothly catch the latch hook through the latch holes. Refer to latch switch adjustments.
2. Deviation of the door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. The door is positioned with its face depressed toward the cavity face plate.
4. Reinstall outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measure ment Procedure.)

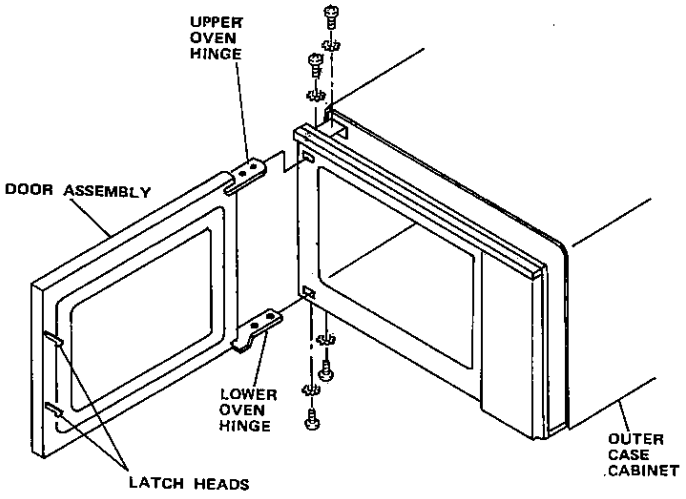


Figure C-5. Door Assembly Replacement and Adjustment

CHOKE COVER REMOVAL

1. Insert an iron plate(thickness of about 0.5mm) or flat type screw driver to the gap between the choke cover and door panel as shown figure to free the engagind part. The protect sheet may be used not to damage the door panel.
2. Lift up the choke cover, now cove is free.

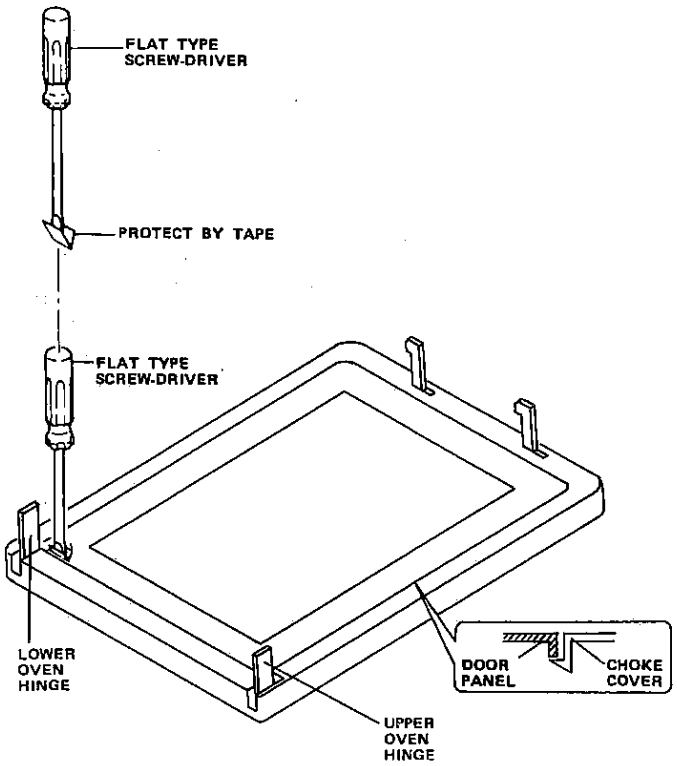


Figure C-6. Choke Cover Removal

DOOR COMPONENTS REMOVAL

Remove the door assembly, referring to from item 1 through item 3 of "DOOR REPLACEMENT".

1. Place the door assembly on a soft cloth with facing up.

(UPPER AND LOWER OVEN HINGE REMOVAL)

2. Remove the choke cover, referring to "CHOKE COVER REMOVAL".
3. Release the oven hinges from the door panel.
4. Now, the oven hinges are free.

(DOOR HANDLE REMOVAL)

5. Remove the two (2) screws holding the door handle to door.
6. Remove the door handle from the door panel.

(UPPER AND LOWER LATCH HEADS REMOVAL)

7. Remove the door release lever from the door assembly.
8. Remove the three (3) screws holding the joint plate to the door panel.
9. Release the latch spring from the tab of the joint lever and joint plate.
10. Release the latch heads from joint lever and joint plate.
11. Now, the latch heads are free.

(DOOR FRAME REMOVAL)

12. Set the four (4) tabs of the door frame upright.
13. Remove the door frame from the door panel. Now, door frame is free.

(DOOR GLASS REMOVAL)

14. Remove the four (4) screws holding the two (2) outside window fixing plates to the door panel.
15. Now, the door glass as free.

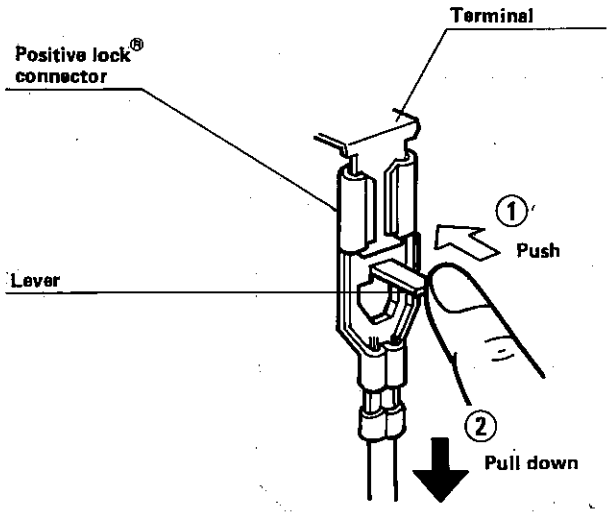


Figure C-7. How to release the positive lock® connector.

Procedure

1. Pushing the lever of positive lock® connecotr,
2. Pull down the connector from the terminal.
3. Now, the connector is free.

Note: If the positive lock has a insulation sleeve, first remove it. If you do not so, you can not push the lever of positive lock® .

CAUTION: The positive lock® terminal can not be disconnected by only pulling. Because once you (Service personnal) have connected the positive lock® connector to the terminal, the positive lock®connector has been locked.

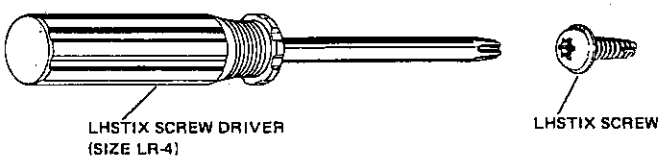
EXHAUST COVERS A AND B REMOVAL

(Exhaust cover A)

1. Remove the two (2) LHSTIX screws holding the exhaust cover A to the rear cabinet, using the special driver LHSTIX (LR-4).
2. Release the tab of the exhaust cover A from the hole of the rear cabinet, and remove the exhaust cover A.
3. Now, the exhaust coverA is free.

(Exhaust cover B)

1. Remove the single (1) LHSTIX screw holding the exhaust cover B to the rear cabinet, using the special driver LHSTIX (LR-4).
2. Release the tab of the exhaust cover B from the hole of the rear cabinet, and remove the exhaust cover B.
3. Now, the exhaust coverA is free.



Note: When securing or loosening the LHSTIX screw, LHSTIX(LR-4) TYPE screw driver should be used.

MICROWAVE MEASUREMENT

After adjustment of door latch switches, monitor switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

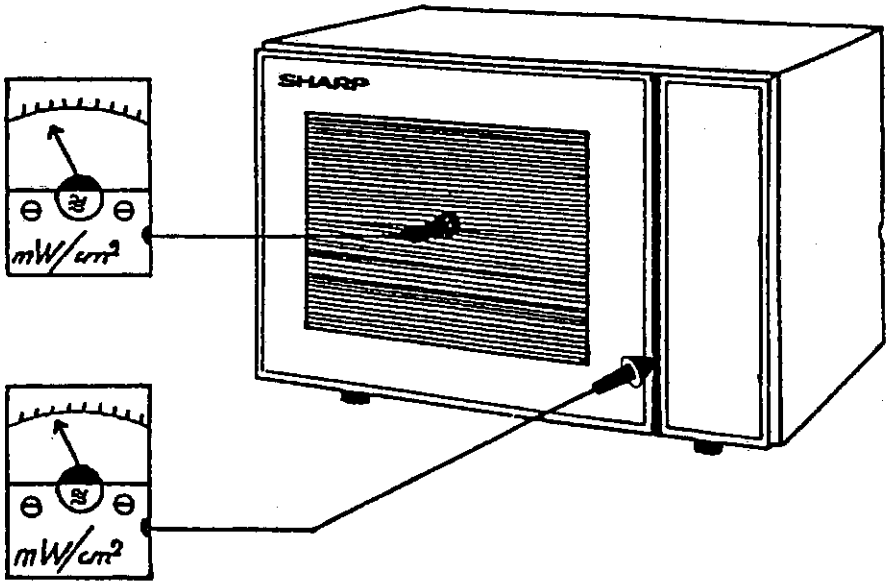
REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of 5mW/cm2 at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING:

Before beginning the actual test for leakage, proceed as follows;

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.
   Important:
   Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.
   Recommended instruments are:
   NARDA 8100
   NARDA 8200
   HOLADAY HI 1500
   SIMPSON 380M
2. Place the oven tray into the oven cavity.
3. Place the load of 275 ±15ml of water initially at 20 ±5 °C in the center of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic.
   The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of the cool water.
5. Move the probe slowly (not faster that 2.5cm/sec.) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.



Microwave leakage measurement at 5 cm distance

TEST DATA AT A GLANCE

Parts	Symbol	Value / Data
Fuse	F1	M8A 250V
Fuse	F2	F8A 250V
13A special fuse	F3	13A
Fuse	F4	F6.3A 250V
MG thermal cut-out	TC1	145 °C
MG thermal cut-out	TC2	145 °C
Blower motor thermal cut-out	TC3	115 °C
Oven temp. fuse	TF	150 °C
Thermister		Approx. 61.5k Ω at 20 °C ..... 39.5K Ω at 30 °C
Surge resistor	R1	10 Ω 20W
Surge resistor	R2	10 Ω 20W
Monitor resistor	R3	3.6 Ω 20W
Oven lamp	OL	230V 25W
Surge relay	RY-S1	Approx. 160 Ω
Surge relay	RY-S2	Approx. 160 Ω
High voltagr capacitor	C1	1.0 µF AC 2100V
High voltagr capacitor	C2	1.0 µF AC 2100V
Power transformer	T1	Filament winding < 1 Ω Secondary winding Approx. 79 Ω Primary winding Approx. 1.3 Ω
Power transformer	T2	Filament winding < 1 Ω Secondary winding Approx. 79 Ω Primary winding Approx. 1.3 Ω
Magnetron	MG1	Filament winding < 1 Ω Filament winding – chassis ∞ Ω
Magnetron	MG2	Filament winding < 1 Ω Filament winding – chassis ∞ Ω

TEST POINTS ON CONTROL UNIT

In/Out put terminal	Test point	Volt	Resistance (Disconnect the power plug and door is closed)
Input terminal (Power suplly)	A5 – A7	220V	Approx. 720 Ω
Output terminal (Stop switch)	B1 – B2		0
Output terminal (Themistor)	B1 – B3	DC. 5V	Approx. 61.5 k Ω at 20 °C ..... 39.5 k Ω at 30 °C
Output terminal (Oven lamp + Blower motor)	A1 – A7	220V	Approx. 34 Ω
Output terminal (Surge relay)	B4 – B5	DC. 14V	Approx. 80 Ω
Output terminal (Earth)	B1 – Chassis		0

WARNING: DISCONNECT THE PLUG WHEN MEASURING RESISTANCE.

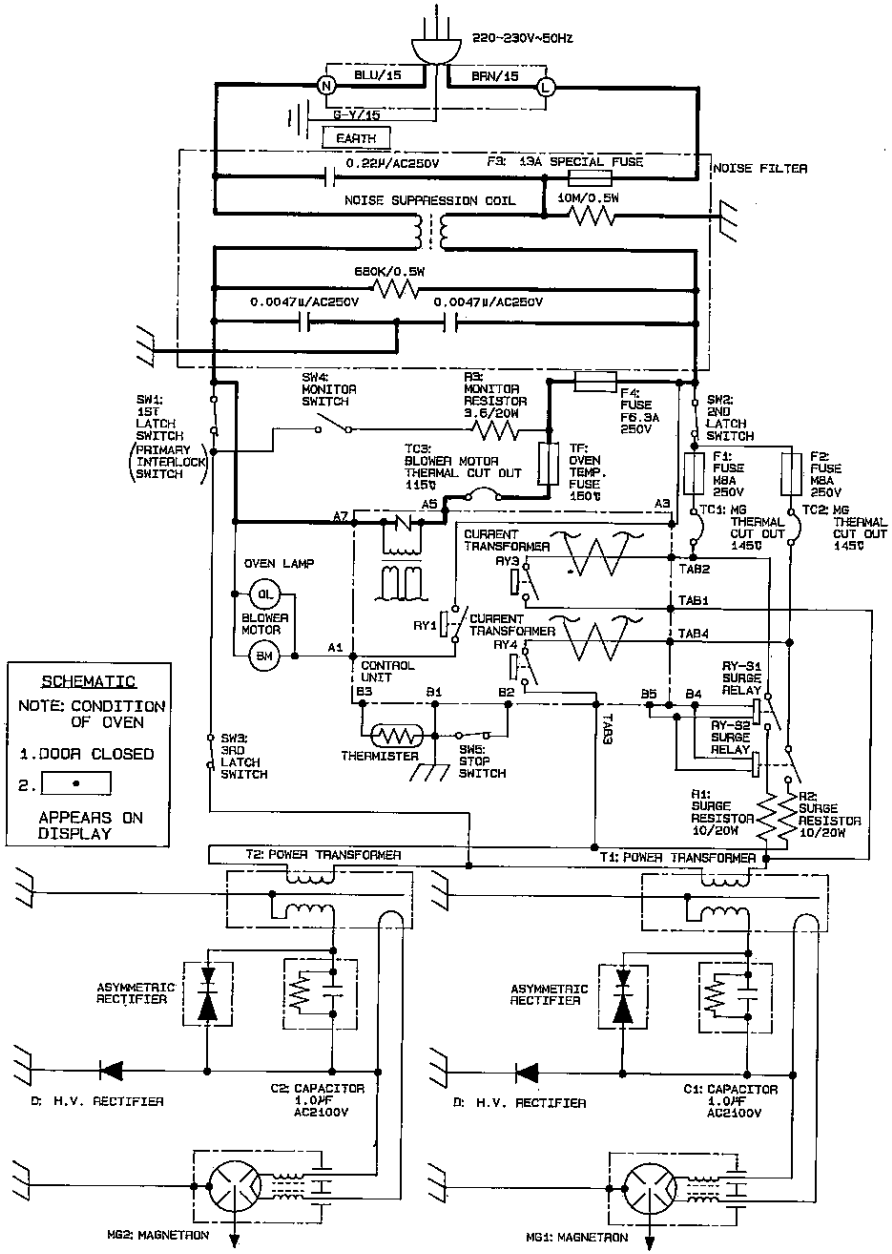


Figure O-1. Oven Schematic — OFF Condition

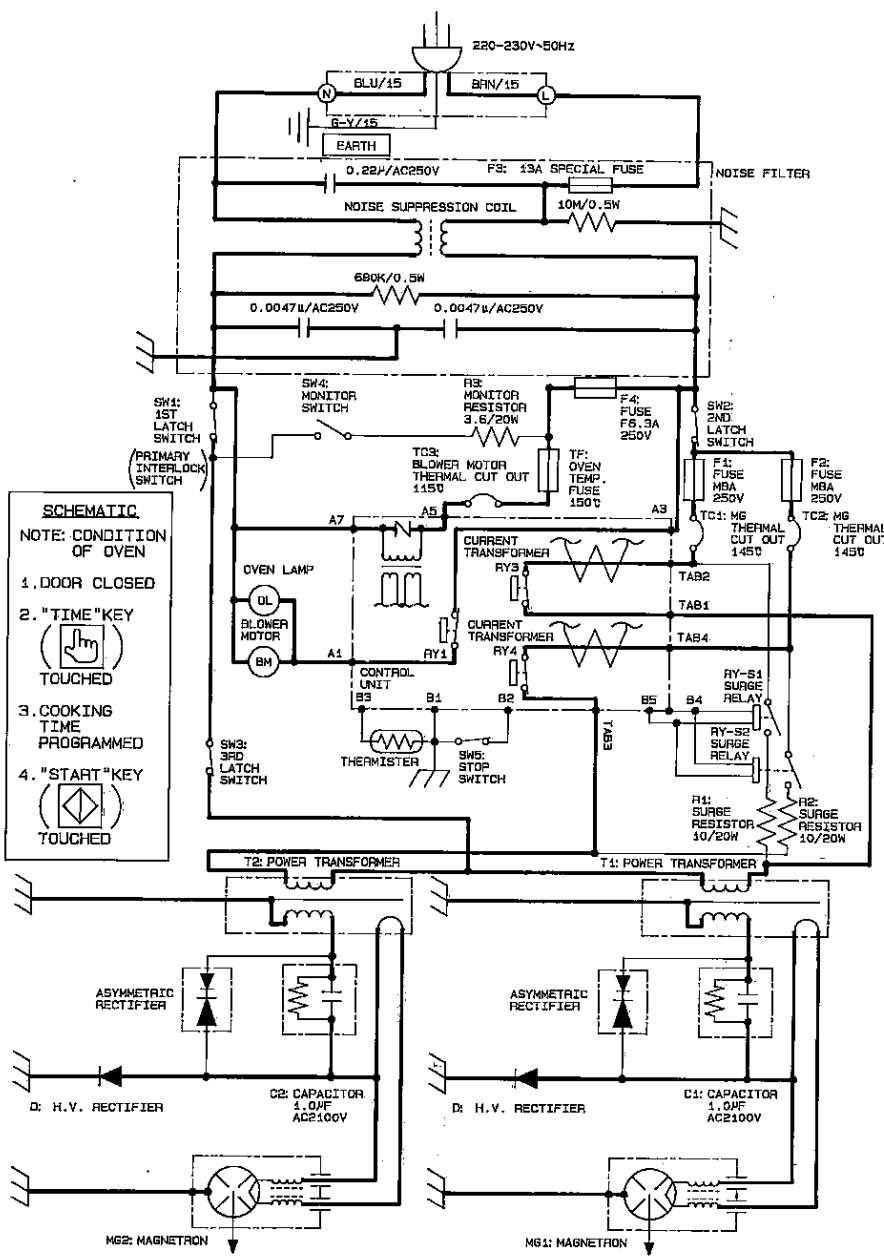


Figure O-2. Oven Schematic — ON Condition

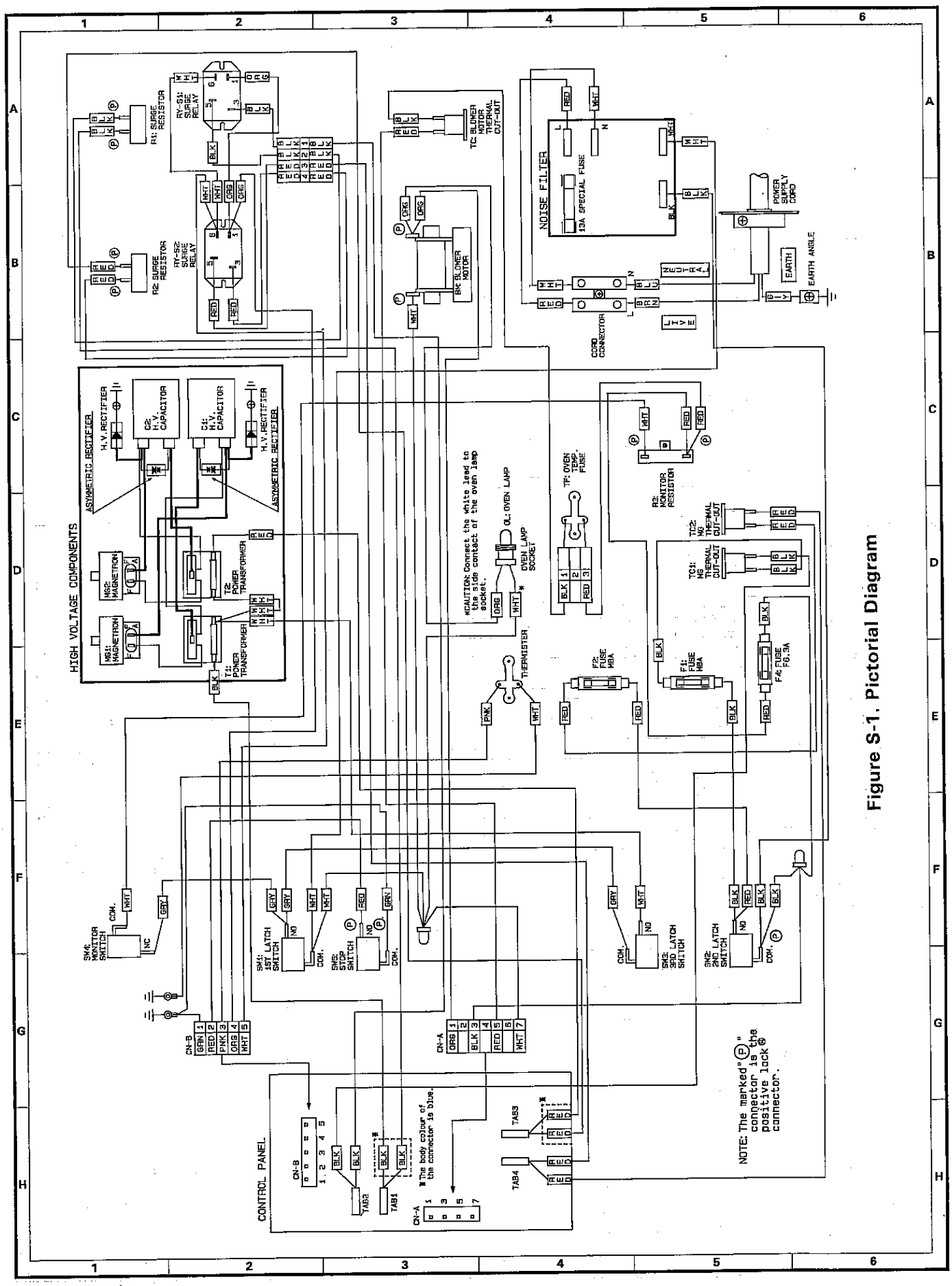


Figure S-1. Pictorial Diagram

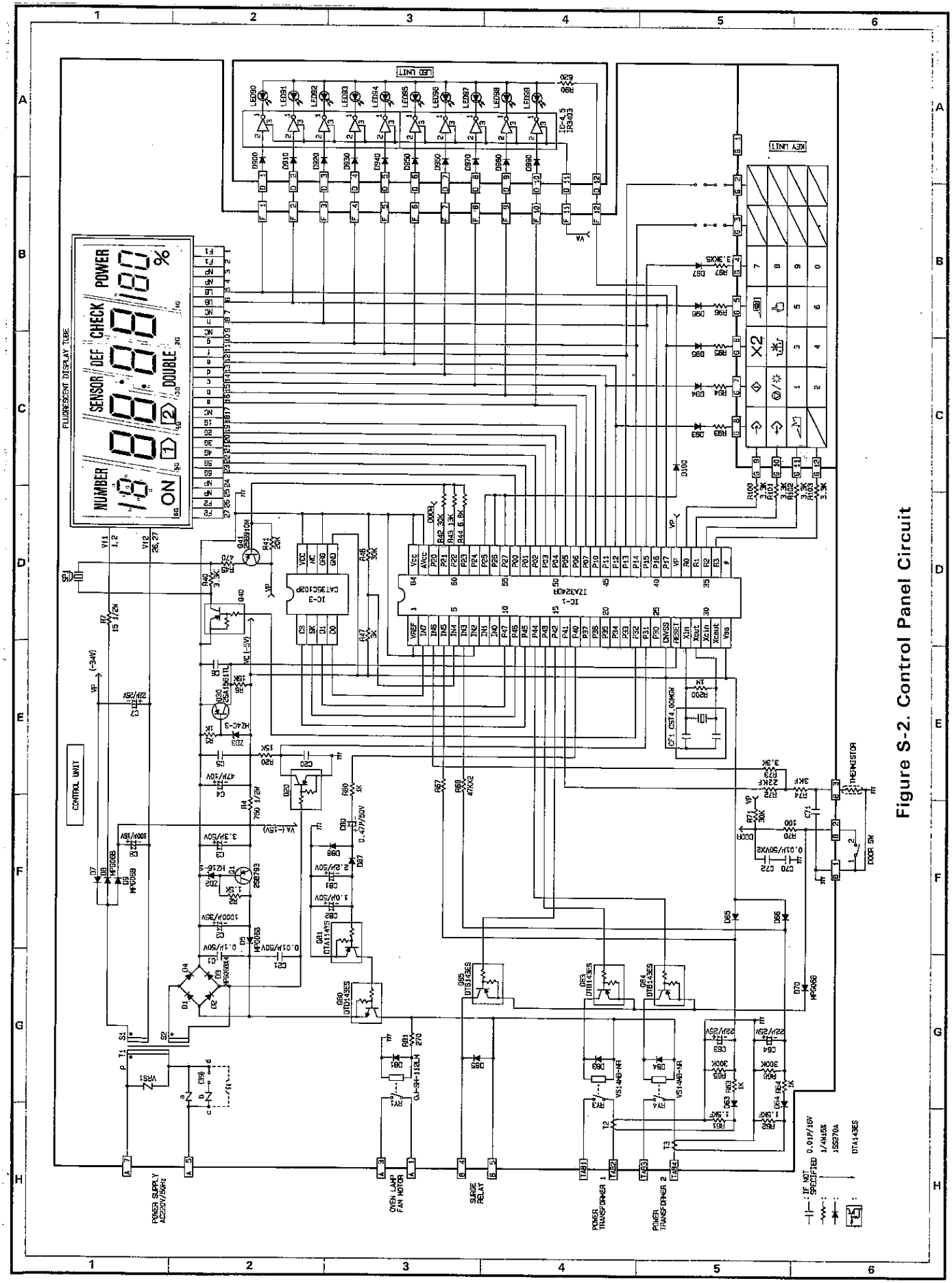
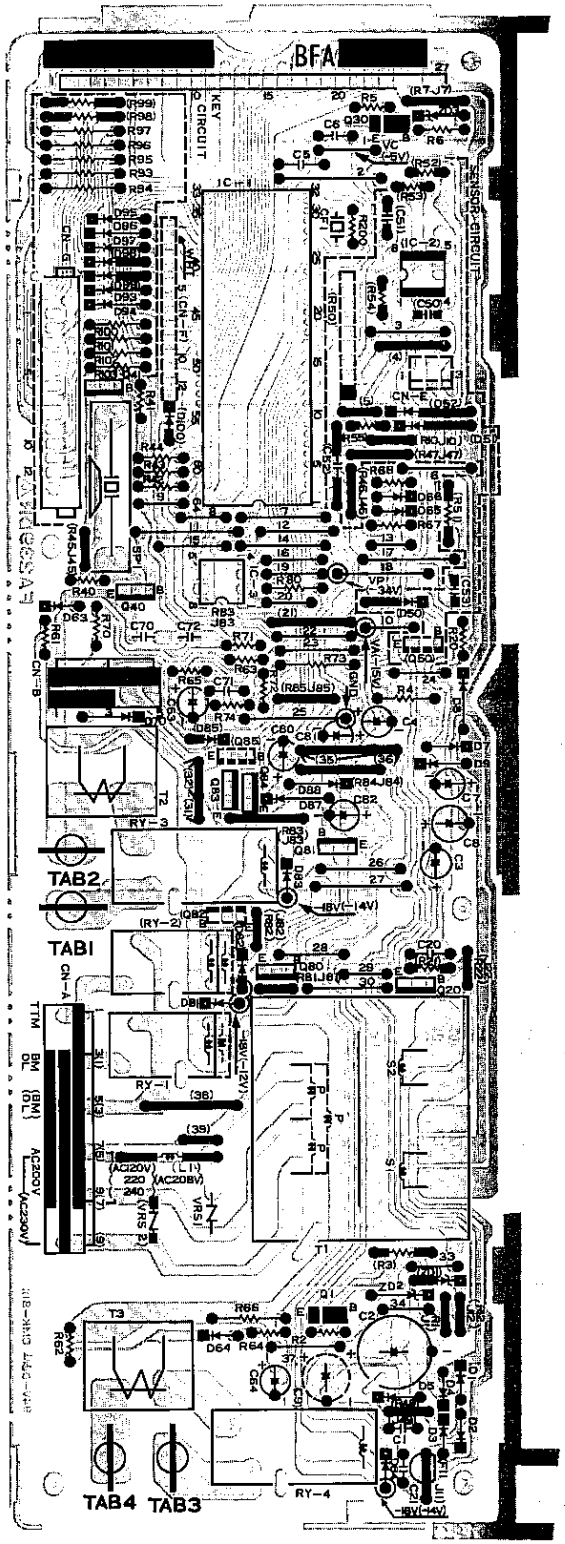


Figure S-2. Control Panel Circuit



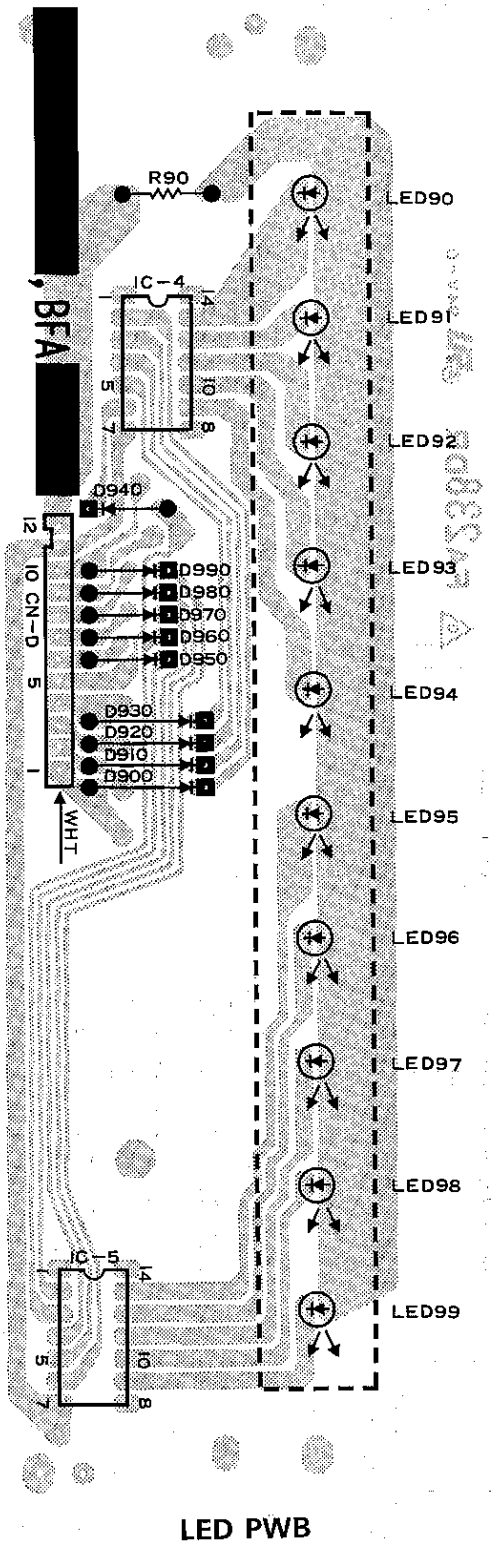


Figure S-3. Printed Wiring Board

PARTS LIST

Note : The parts marked "*" are used in voltage more than 250V.

	REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
			ELECTRICAL PARTS		
	BM	FMOTEA215WRK0	Blower motor assembly (Class B)	1	BM
*	C1, C2	RC-QZA119WRE0	High voltage capacitor	2	AV
*	D	FW-QZA066WRK0	HVC rectifier assembly with HVC harness assembly	1	AW
	F1, F2	QFS-CA010WRE0	Fuse M8A	2	AE
	F3	QFS-CA009WRE0	13A special fuse	1	AE
	F4	QFS-CA007WRE0	Fuse F6.3A	1	AD
*	MG1, MG2	RV-MZA136WRE0	Magnetron	2	BH
	OL	RLMPTA028WRE0	Oven lamp	1	AK
	R1, R2	RR-WZ0026WRE0	Surge resistor 10 Ω / 20 W	2	AH
	R3	RR-WZ0027WRE0	Monitor resistor 3.6 Ω 20W	1	AH
	RY-S1	RRLY-A014WRE0	Surge relay	1	AP
	RY-S2	RRLY-A014WRE0	Surge relay	1	AP
	SW1	QSW-MA095WRE0	SW1 ; 1st latch switch	1	AF
	SW2	QSW-MA095WRE0	SW2 ; 2nd latch switch	1	AF
	SW3	QSW-MA095WRE0	SW3 ; 3rd latch switch	1	AF
	SW4	QSW-MA048WRE0	SW4 ; Monitor switch	1	AG
	SW5	QSW-MA047WRE0	SW5 ; stop switch	1	AG
*	T1, T2	RTRN-A292WRE0	Power transformer	2	BQ
	TC1, TC2	RTHM-A037WRE0	Magnetron thermal cut-out 145 °C	2	AG
	TC3	RTHM-A058WRE0	Blower motor thermal cut-out 115 °C	1	AG
	TF	FFS-TA001WRK0	Oven temp. fuse 150 °C assembly	1	AL
	1- 1	DH-HZA006WRK0	Thermistor assembly	1	AN
	1- 2	QACCVA048WRE0	Power supply cord	1	AW
	1- 3	QFSHDA002WRE0	Fuse holder	3	AF
	1- 4	QSOCLA011WRE0	Oven lamp socket	1	AH
	1- 5	FPWBFA213WRE0	Noise filter	1	AU
	1- 6	QTANNA001WRE0	Cord connector	1	AF
			CABINET PARTS		
	2- 1	PSHEGA001WRE0	Rubber sheet A	2	AE
	2- 2	PSHEGA002WRE0	Rubber sheet B	2	AE
	2- 3	FFTASA045WRY0	Oven lamp access cover assembly, complete	1	AM
	2- 3-1	GFTASA041WRP0	Oven lamp access cover	1	AL
	2- 3-2	PCUSU0407WRP0	Cushion	1	AA
	2- 4	GCABUA292WRP0	Outer case cabinet	1	BG
	2- 5	PCUSUA245WRP0	Cabinet cushion (20mm x 30mm x 200mm) with	1	AD
	2- 6	PFILWA001WRP0	Bottom plate sheet A	1	AH
	2- 7	GCOVAA155WRW0	Rear cabinet	1	AV
	2- 8	GCOVHA219WRY0	Exhaust cover B	1	AF
	2- 9	PCLICA011WRE0	Cabinet clip	6	AA
	2-10	FCOVHA021WRY0	Exhaust cover A	4	AM
			CONTROL PANEL PARTS		
	3- 1	CPWBFA348WRK0	Control unit	1	BU
	3- 1A	QCNCMA078DRE0	4-pin connector (A)	1	AC
	3- 1B	QCNCMA130DRE0	5-pin connector (B)	1	AC
	3- 1C	QCNCMA019DRE0	12-pin connector (F)	1	AD
	3- 1D	QCNCWA030DRE0	12-pin connector (G)	1	AF
	3- 1E	QLUG-010HHRE0	Tab terminal (T-86028)	4	AB
	3- 1F	RV-KXA032DRE0	Fluorescent display (FV418G)	1	AW
	3- 1J	LHLD-A068WRF0	Fluorescent display tube holder	1	AE
	C1	RC-KZA032DRE0	Capacitor 0.1 µF 50V	1	AB
	C2	VCEAB31VW108M	Capacitor 1000 µF 35V	1	AD
	C3	VCEAB31HW335M	Capacitor 3.3 µF 50V	1	AA
	C4	VCEAB31AW476M	Capacitor 47 µF 10V	1	AA
	C5,6,20, C71	VCKYD11CY103N	Capacitor 0.01 µF 16V	4	AA
	C7,63,64	VCEAB31EW226M	Capacitor 22 µF 25V	3	AA

Note : The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
C8	VCEAB31CW107M	Capacitor 100 µF 16V	1	AB
C21,70	VCKYF31HF103Z	Capacitor 0.01 µF 50V	3	AA
C72				
C80	VCEAB31HW474M	Capacitor 0.47 µF 50V	1	AA
C81	VCEAB31HW225M	Capacitor 2.2 µF 50V	1	AA
C82	VCEAB31HW105M	Capacitor 1 µF 50V	1	AA
CF1	RCRS-A010DRE0	Ceramic resonator CST4.00MHz	1	AD
D1-5,8,	VHDMPG06B//-1	Diode (MPG06B)	8	AA
D9,70				
D7,63-66	VSD1SS270A/-1	Diode (1SS270A)	17	AA
D81,83, D84,85, D87,88, D93-97, D100				
IC1	RH-IZA324DRE0	LSI (M50941)	1	AW
IC3	VHICAT35102-4	IC (CAT35C102P)	1	AP
Q1	VS2SB793//-4	Transistor (2SB793)	1	AC
Q20,40	VSDTA143ES/1B	Transistor (DTA143ES)	2	AB
Q30	VS2SA1561TL-3	Transistor (2SA1561TL)	1	AA
Q41	VS2SB910MR/-4	Transistor (2SB910M)	1	AC
Q80	VSDTD143ES/-3	Transistor (DTD143ES)	1	AC
Q81	VSDTA114YS/-3	Transistor (DTA114YS)	1	AB
Q83,84	VSDTB143ES/-3	Transistor (DTB143ES)	3	AB
Q85				
R2	VRD-B12EF152J	Resistor 1.5k Ω 1/4W	1	AA
R4	VRD-B12HF751J	Resistor 750 Ω 1/2W	1	AA
R5,63,64	VRD-B12EF102J	Resistor 1.0k Ω 1/4W	4	AA
R80				
R6,20	VRD-B12EF153J	Resistor 15k Ω 1/4W	2	AA
R7	VRD-B12HF150J	Resistor 15 Ω 1/2W	1	AA
R40,73,	VRD-B12EF332J	Resistor 3.3k Ω 1/4W	11	AA
R93-97,				
100-103				
R41	VRD-B12EF203J	Resistor 20k Ω 1/4W	1	AA
R42,46,	VRD-B12EF303J	Resistor 30k Ω 1/4W	3	AA
R71				
R43	VRD-B12EF133J	Resistor 13k Ω 1/4W	1	AA
R44	VRD-B12EF682J	Resistor 6.8k Ω 1/4W	1	AA
R45	VRD-B12EF471J	Resistor 470 Ω 1/4W	1	AA
R47	VRD-B12EF302J	Resistor 3.0k Ω 1/4W	1	AA
R61,62	VRN-B12EK152F	Resistor 1.5kF Ω 1/4W	2	AA
R65,66	VRD-B12EF304J	Resistor 300k Ω 1/4W	2	AA
R67,68	VRD-B12EF473J	Resistor 47k Ω 1/4W	2	AA
R70	VRD-B12EF101J	Resistor 100 Ω 1/4W	1	AA
R72	VRN-B12EK223F	Resistor 22KF Ω 1/4W	1	AA
R74	VRN-B12EK302F	Resistor 3.0kF Ω 1/4W	1	AA
R81	VRD-B12EF271J	Resistor 270 Ω 1/4W	1	AA
R200	VRD-B12EF105J	Resistor 1M Ω 1/4W	1	AA
RY1	RRLY-A020DRE0	Relay (OJ-SH-112LM)	1	AH
RY3,4	RRLY-A059DRE0	Relay (VS14MB-NR)	2	AM
SP1	RALM-A003DRE0	Buzzer (PS3025P02)	1	AF
T1	RTRNPA063DRE0	Touch control transformer	1	AT
T2,3	RTRN-A060DRE0	Current transformer (A060)	2	AH
VRS1	RH-VZA010DRE0	Varistor (TNR15G471K)	1	AE
ZD2	VHEHZ161///-1	Zener diode (HZ16-1)	1	AA
ZD3	VHEHZ4C3///-1	Zener diode (HZ4C-3)	1	AA
3- 2	DPWBFA668WRK0	LED unit	1	AX
3- 2A	FCNCWA005DRE0	12-pin connector (D)	1	AL
3- 2B	PSHE-A009DRE0	LED tape	1	AC
D900,910	VSD1SS270A/-1	Diode (1SS270A)	10	AA
D920,930				
D940,950				
D960,970				
D980,990				
IC4,5	VHIIR3403//-4	IC (IR3403)	2	AE
LED90-99	VHPSLB74VR/-6	LED (SLB-74VR)	10	AB
R90	VRD-B12EF621J	Resistor 620 Ω 1/4W	1	AA
3- 3	FPNLCA803WRK0	Control panel frame assembly with key unit	1	BB

Note : The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
3- 4	LANGTA243WRW0	Control panel mounting angle	1	AF
3- 5	XEPSD30P10XS0	Screw; control unit mounting and led unit mounting	6	AA
3- 6	XEPSD40P12000	Screw; control panel mounting angle mounting	1	AA
3- 7	XHTSD40P08TV0	Screw; decoration panel mounting for earth	1	AA

OVEN PARTS

4- 1	FGLSPA021WRY0	Ceramic shelf	1	BD
4- 2	FOVN-A196WRY0	Oven cavity assembly	1	BS
4- 3	PFILWA013WRP0	Oven lamp filter	1	AB
4- 4	MLEVPA153WRF0	Switch lever A	1	AC
4- 5	MLEVPA154WRF0	Switch lever B	1	AC
4- 6	MLEVPA155WRF0	Switch lever C	1	AC
4- 7	MSPRCA075WRE0	Switch spring A	1	AB
4- 8	MSPRCA076WRE0	Switch spring B	3	AB
4- 9	PHOK-A056WRF0	Latch hook	1	AH
4-10	LANGQA251WRW0	Noise filter angle	1	AF
4-11	LSTPPA048WRF0	Cord anchorage (upper)	1	AB
4-12	LSTPPA049WRF0	Cord anchorage (lower)	1	AB
4-13	FCOVPA019WRY0	Stirrer cover assembly	1	AS
4-14	FFANMA011WRY0	Stirrer fan assembly	1	AN
4-15	FFIL-A003WRK0	Air intake filter assembly	1	AU
4-16	HDECEA001WRP0	Decoration sash	1	AR
4-17	HDECQA146WRM0	Corner cap left	1	AE
4-18	HDECQA147WRM0	Corner cap right	1	AE
4-19	LANGQA250WRP0	Oven lamp mounting plate	1	AD
4-20	LANGQ0382WRM0	Earth angle	1	AB
4-21	LBNDKA075WRP0	Capacitor holder	1	AD
4-22	PPACGA068WRE0	HVT packing	2	AC
4-23	PCOVWA009WRP0	Magnetron duct cover	1	AR
4-24	PCUSGA110WRE0	Fan cushion A (2mm x 20mm x 50mm)	3	AA
4-25	PCUSGA270WRP0	Fan cushion B (18mm x 12mm x 40mm)	2	AB
4-26	PCUSGA275WRP0	BLM cushion	1	AB
4-27	PCUSG0097YBP0	Protector cushion	1	AA
4-28	PCUSUA055WRP0	Duct cushion	1	AA
4-29	PCUSUA056WRP0	Orifice cushion	1	AA
4-30	PCUSUA230WRP0	Magnetron duct cushion	1	AB
4-31	PCUSUA142WRP0	Trans. cushion	1	AB
4-32	PCUSUA200WRP0	Cushion	4	AA
4-33	PCUSUA228WRP0	Oven lamp cushion	1	AC
4-34	PDUC-A379WRF0	Exhaust duct	1	AL
4-35	PDUC-A380WRW0	Stirrer duct	1	AV
4-36	PDUC-A381WRF0	Air duct	1	AK
4-37	PGIDHA038WRP0	Air guide A	1	AD
4-38	PGIDHA039WRP0	Air guide B	1	AD
4-39	PGIDHA040WRP0	Air guide C	1	AC
4-40	LANGQA264WRP0	Surge relay angle	1	AE
4-41	FDAI-A123WRT0	Bottom plate	1	BB
4-42	PCUSGA271WRP0	Magnetron cushion	1	AB
4-43	PCUSGA272WRP0	Magnetron partition cushion	1	AB
4-44	PCOVPA221WRP0	Stirrer shaft cover	1	AF
4-47	PSKR-A220WRP0	Partition plate	1	AD
4-48	PZETEA042WRP0	H.V. cover	1	AF
4-49	PZETEA043WRP0	H.V. insulation sheet	1	AF
4-50	PCUSGA045WRP0	Cushion	1	AA
4-51	PCUSUA246WRP0	Blower cushion	1	AD
4-52	PZETEA046WRP0	Insulation sheet	1	AC
4-53	PZETEA047WRP0	Switch insulator	1	AC

DOOR PARTS

5	DDORFA397WRK0	Door assembly, complete	1	BT
5- 1	FCOVAA041WRY0	Door frame	1	BC
5- 2	FDORFA185WRT0	Door panel	1	BL
5- 3	FHNDMA006WRY0	Door release lever	1	AH
5- 4	JHNDMA026WRM0	Door handle	1	AT
5- 5	PGID-0024WRF0	Handle guide	4	AC
5- 6	PGID-0025WRF0	Handle spacer	1	AC
5- 7	FANGKA164WRY0	Joint plate	1	AH

Note : The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
5- 8	FLEVFA015WRY0	Joint lever	1	AG
5- 9	LSTPCA001WRM0	Latch head	2	AK
5-10	MLEVPA156WRF0	Latch lever	1	AC
5-11	MSPRCA074WRE0	Latch spring	1	AB
5-12	GCOVHA217WRF0	Choke cover	1	AM
5-13	LANGKA454WRP0	Outside window fixing plate	2	AD
5-14	MHNG-A215WRM0	Upper oven hinge	1	AG
5-15	MHNG-A216WRM0	Lower oven hinge	1	AG
5-16	PCUSGA057WRP0	Handle cushion	1	AA
5-17	PCUSGA276WRP0	Door glass cushion	2	AC
5-18	PGLSPA254WRE0	Door glass	1	AV
5-19	PSHEPA325WRE0	Inside film	1	AE
5-20	HBDGCA027WRE0	Sharp badge	1	AG
5-21	PSHEPA354WRP0	Door case sheet	1	AB

MISCELLANEOUS

6- 1	TINSEA518WRR0	Operation manual	1	AW
6- 2	TLABHA019WRR0	Memory sticker	1	AG
6- 3	FW-VZA927WRE0	Switch harness	1	AM
6- 4	FW-VZA928WRE0	Main harness	1	BA
6- 5	FW-VZA893WRE0	Terminal harness	1	AD
6- 6	LBNDK0012YBE0	Wire holder (WH-1 L 84mm)	2	AA
6- 7	TSPCNB360WRR0	Name plate	1	AD
6- 8	VTG05003050E0	Glass tube	5	AA
6- 9	TCAUHA082WRR0	Caution label	1	AC
6-10	TCAUHA083WRR0	Belgium label	1	AB
6-11	LHLDWA004BDE0	Purse lock with snap	1	AB
6-12	FW-VZA931WRE0	Surge relay harness	1	AF
6-13	LANGKA453WRP0	Mounting plate	1	AE
6-14	LHLDW0017YBE0	Space clip	1	AA
6-15	TLABSA008WRR0	Fuse label F6.3A	1	AA
6-16	TLABSA018WRR0	Fuse label M8A	1	AA
6-17	LANGKA499WRE0	Cord protector plate	1	AK
6-18	PZET-A011WRE0	One touch sleeve	2	AA

SCRERWS, NUT AND WASHERS

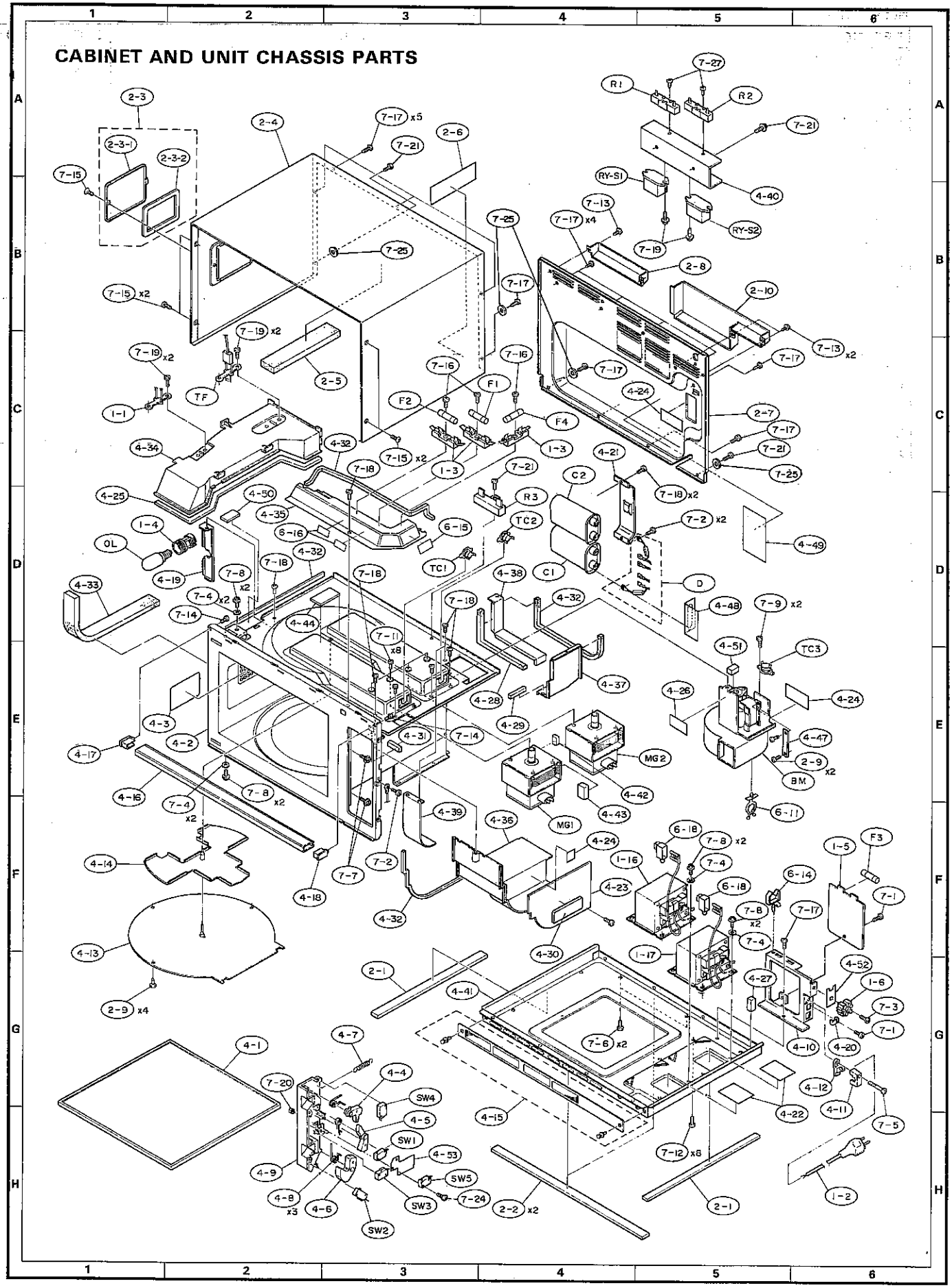
7- 1	XFPSD40P08K00	Screw 4mm x 8mm	6	AA
7- 2	XHTSD40P08RV0	Screw 4mm x 8 mm	3	AA
7- 3	XFPSD30P18000	Screw 3mm x 18mm	1	AA
7- 4	XWWSD50-06000	Washer 5mm x 0.6mm	6	AA
7- 5	XFPSD40P20000	Screw 4mm x 20mm	1	AB
7- 6	LX-CZA038WRE0	Special screw	2	AA
7- 7	LX-EZA004WRE0	Special screw	2	AA
7- 8	XBPSD50P12KS0	Screw	8	AB
7- 9	XCPSD30P06000	Screw 3mm x 6mm	2	AA
7-11	XFPSD40P08000	Screw 4mm x 8mm	8	AA
7-12	XOTSF40P12000	Screw 4mm x 12mm	8	AA
7-13	LX-CZA029WRE0	LHSTIX screw(LHSTIX: LR-4)	3	AA
7-14	XJPSD40P10000	Screw 4mm x 10mm	2	AA
7-15	XONSC40P10000	Screw 4mm x 10mm	5	AA
7-16	XFPSD30P10000	Screw 3mm x 10mm	3	AA
7-17	XOTSC40P12000	Screw 4mm x 12mm	11	AB
7-18	XOTSD40P12000	Screw 4mm x 12mm	9	AA
7-19	XEPSD30P12X00	Screw 3mm x 12mm	6	AA
7-20	XNESD30-24000	Screw 3mm x 24mm	1	AA
7-21	XOTSD40P12000	Screw 4mm x 12mm	2	AA
7-22	XBPSD40P10K00	Screw 4mm x 10mm	2	AA
7-23	XHTSD40P08K00	Screw 4mm x 8mm	4	AA
7-24	XBPSD30P28KS0	Screw 3mm x 28mm	1	AA
7-25	XWVSD40-04000	Washer 4mm x 0.4mm	6	AA

HOW TO ORDER REPLACEMENT PARTS

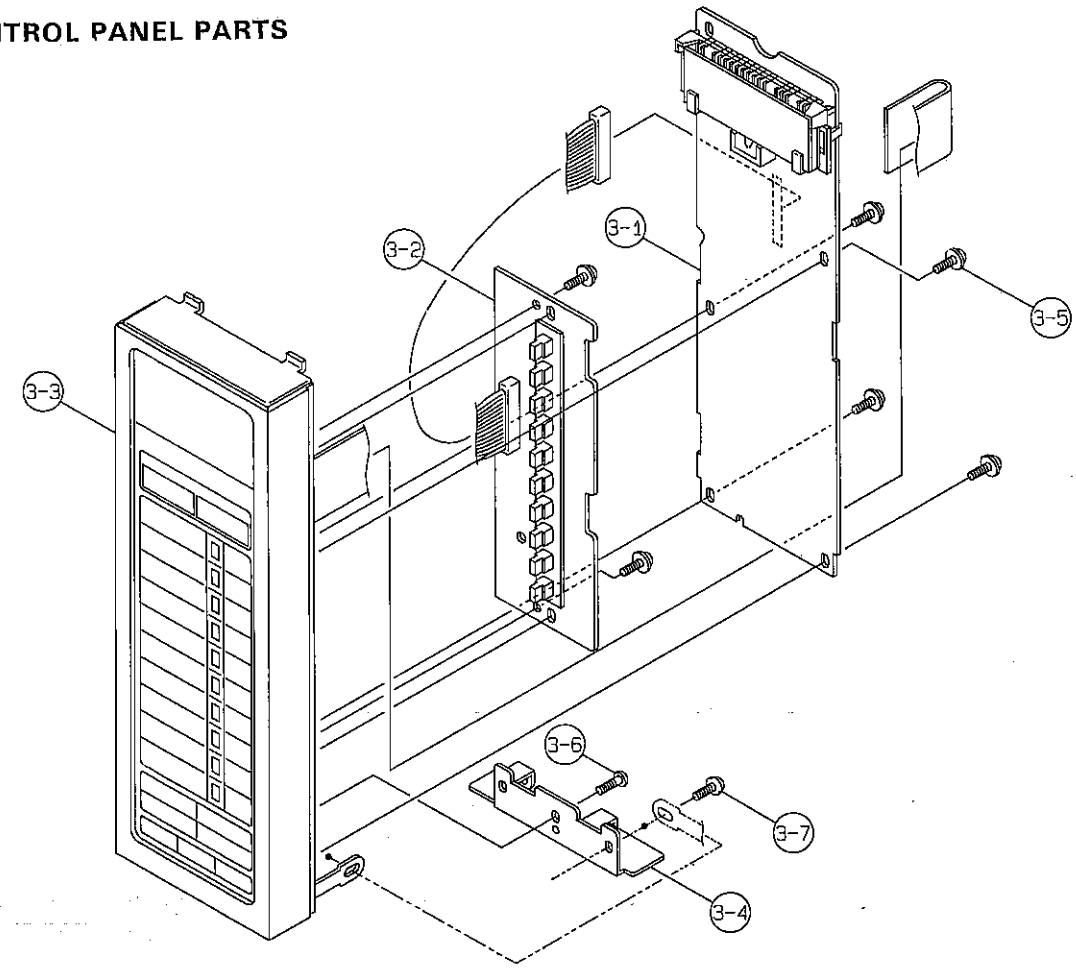
To have your order filled promptly and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

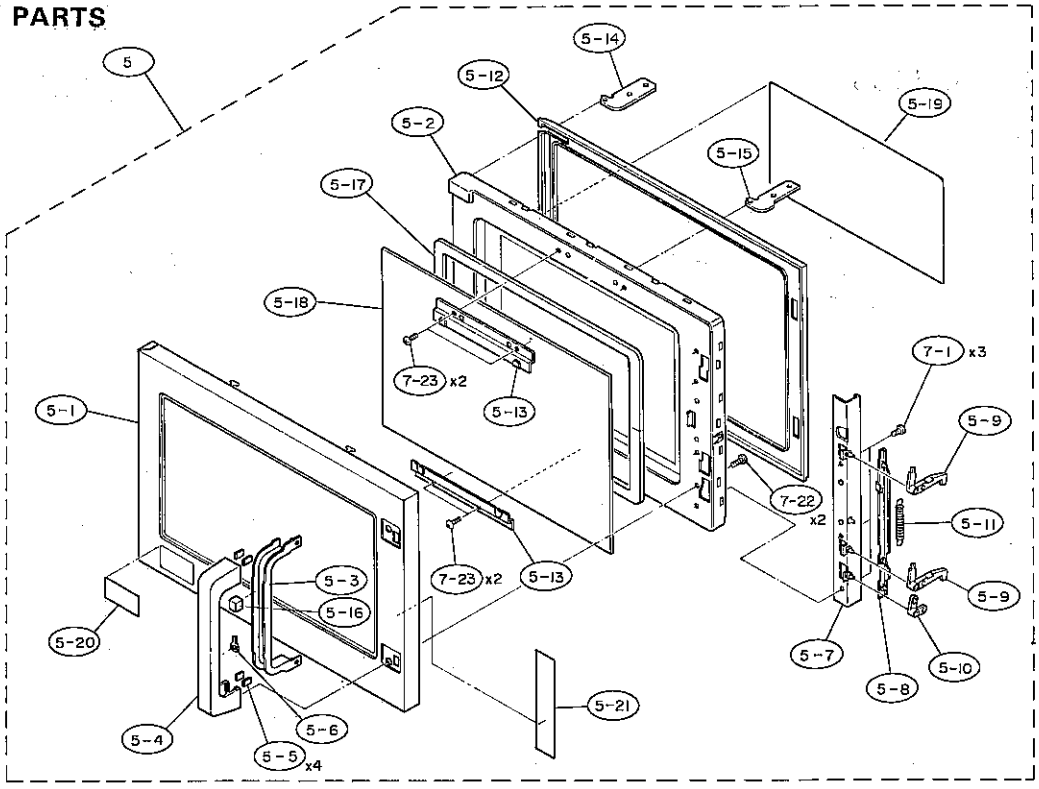
CABINET AND UNIT CHASSIS PARTS



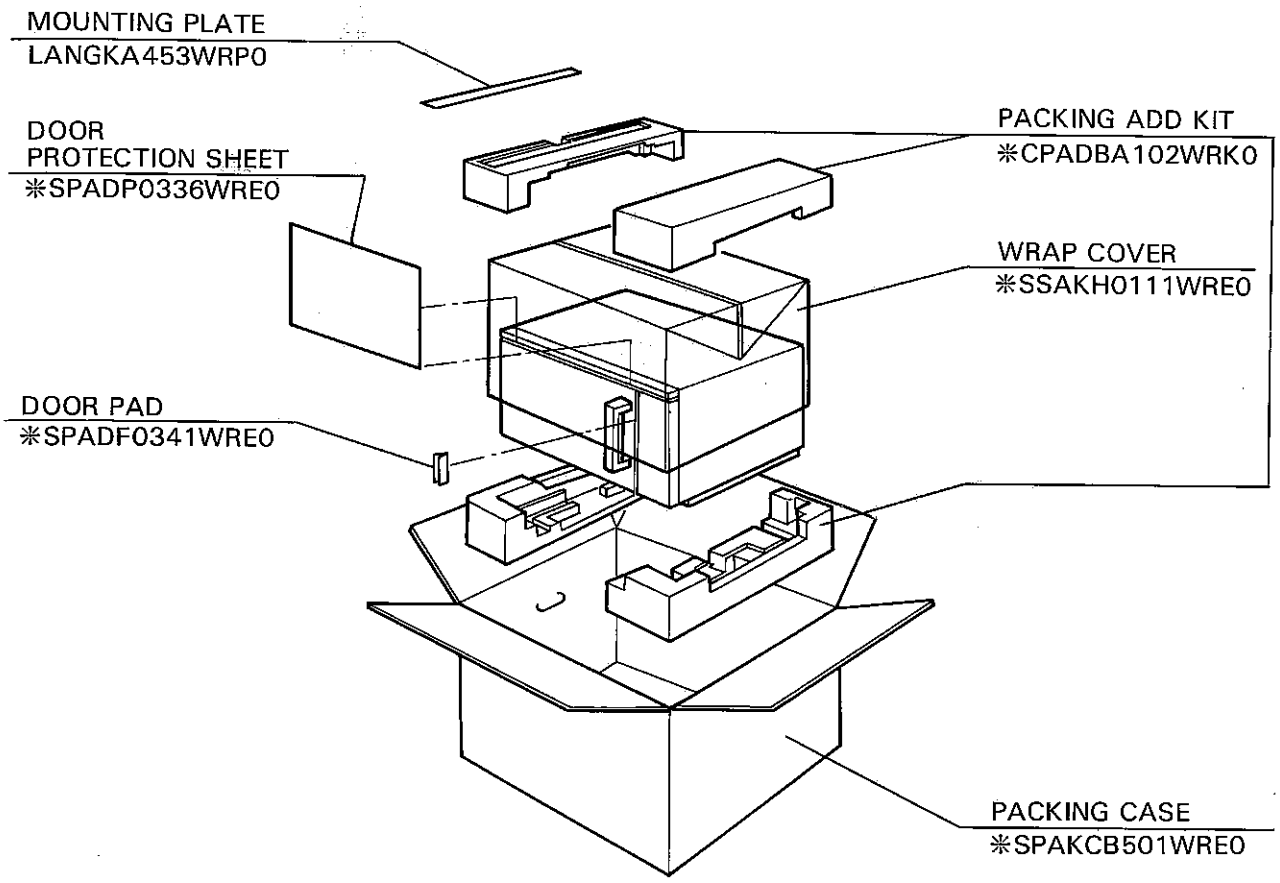
CONTROL PANEL PARTS



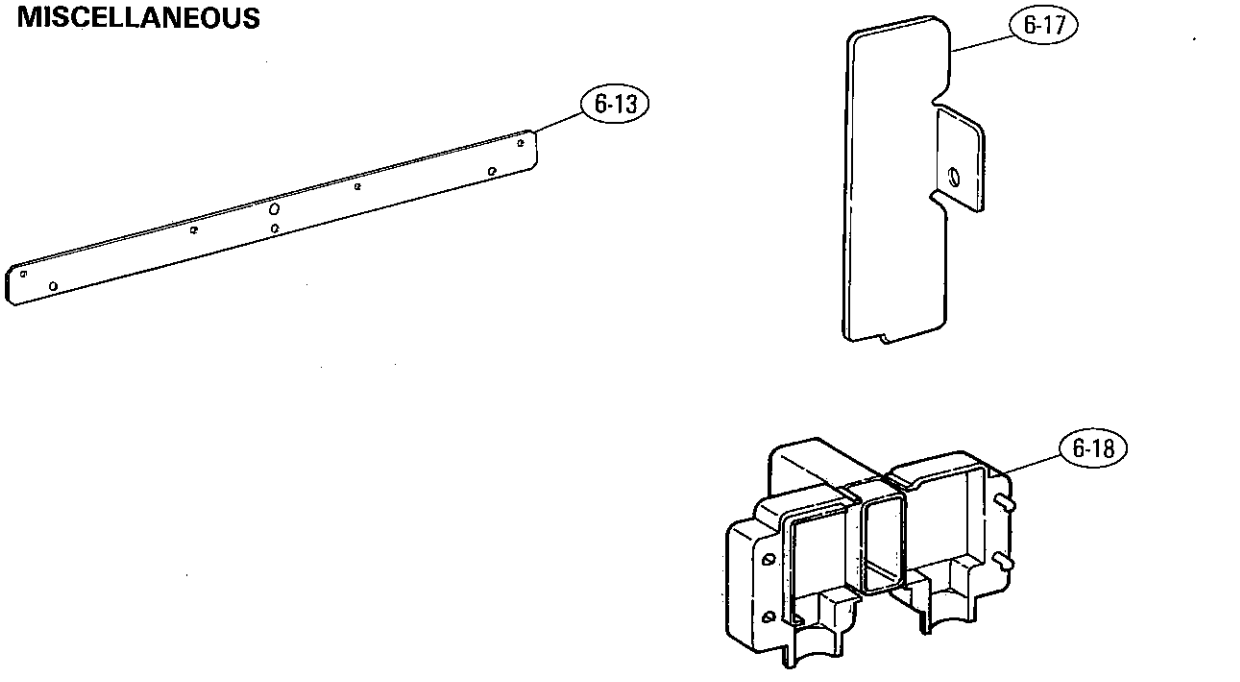
DOOR PARTS



PACKING



MISCELLANEOUS



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330 Slade Lane, Manchester M19 2BY Tel: 061-224-6577